

Exhibit B1

NMS RELEASE 1.0 FUNCTIONAL SPECIFICATION

PROJECT NAME "JUMPPAD"


Revision 0.9G



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Trapeze Networks Proprietary

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| Revision | Who | Date | Description |
|----------|-----------|------|---|
| 0.1 | Allan | | Original |
| 0.2 | Yun | | Added more detailed tree view and map view for the configuration management, added details on performance and fault management |
| 0.3 | Allan | | Refinements |
| 0.4 | Yun | | Modify after review with Allan |
| 0.5 | Allan | | Updates to the performance and fault areas |
| 0.6 | Yun | | Updates to the Configuration section |
| 0.7 | Jim | | Added use cases for config, fault and performance. |
| 0.8 | Allan | | Various updates across the document including installation, overview, HP OV and re-organize various sections. Added a host of comments to be worked on. |
| 0.9 | Yun | | Added image download, FS support, and Deploy section; Fixed PM and FM based on Allan's comment |
| 0.9a | Yun & Jim | | Changes to Install, Plan & Deploy sections. Added more details & GUI views throughout. Added State models for device. |
| 0.9b | Jim | | Completed Planning section with coverage planning details. |
| 0.9c | Yun | | Added Section 6 Configuration Support |
| 0.9d | CT | | Added Section 5: Verify |
| 0.9e | Jim | | Filled in NMS persistency section |
| 0.9f | Allan | | Minor updates and corrections. |
| 0.9g | Yun | | Added Client Management Section 6.8 |
| | | | |

1 INTRODUCTION

1.1 GOALS AND SCOPE

The goal of this document is provide a functional specification of the **Trapeze Networks** network management product. It is not intended to be a software design specification or define future release requirements or functionality. It is strictly focused on the release 1.0 product capabilities.

NOTE: The internal product name is "JumpPad". We use "JumpPad" throughout this document and this name will be replaced by the eventual product name in all distributed software and manuals.

1.2 OVERVIEW

The primary focus of the network management solution in the 1.0 timeframe is to provide a solution to the following functional areas associated with managing Trapeze Wireless networks:

- Configuration/Provisioning Management
 - It is really important that we provide tools to enable a network manager to easily plan and provision networks built from our equipment.
 - The tools must encompass configuration for new networks as well as existing deployed networks and manage both images and configurations in an integrated way.
- Performance Management
 - For our networks it will be critical that we provide tools to understand how the network is performing for both the wired and wireless parts.
- Fault Management
 - Faults in the network, particularly wireless, will be common place and it is necessary we provide insightful ways of showing and highlighting issues that are occurring in live networks.
- Client Management
 - As part of the solution we will provide mechanisms to find clients in the network and do basic performance/fault management for those clients.

Other key goals for this product are:

- Easily installed and running quickly.
 - No complicated installation or pre-installation requirements. The product should be downloadable from the web and running within minutes of installation.
- Demo friendly.
 - For our company to be successful, it is CRITICAL that the network management product gives a great demo to our customers and allows us to show the full

capabilities of the network products. It should clearly highlight the company/product differentiators.

- Integrates with existing customer tools
 - Most enterprise networks consist of OEM equipment and therefore other tools will be required by a network manager if they are managing such environments. We have to co-exist with such tools gracefully and not assume or require that the customer is running only our solution.

Our tool will target fitting into a network manager's workflow rather than forcing the network manager to change how they do their job. Most network manager's follow the common steps described below. These steps are not a strict sequence, as depicted by Figure 1:

1. *Plan Network*

- The user defines a network plan. The goal is to easily define devices (DPs, APs, etc.) and topological elements like sites, buildings, floors, etc and mappings between the two. The user is able to operate in either a "logical view" where the network plan is presented as a list of devices and connections, or a "topological view" where the network plan also contains buildings, floors, etc (and the mappings between devices and the topology.) A logical view shows a containment view with DPs, APs, and links, regardless of where they are located. A topological view allows the user to see which devices are contained in, for example, a floor regardless of their device associations. It is possible that the user does not define any topological elements in which case only the logical view is available.

2. *Deploy Network*

- The user (or someone) physically installs the devices. Next, the user will select a set of network elements in a network plan and change them to a managed state and deploy a configuration to them. This will cause the application to initiate communication with the network elements. The user must be able to do this in a piecemeal fashion (mainly to allow a steady growth of networks.)

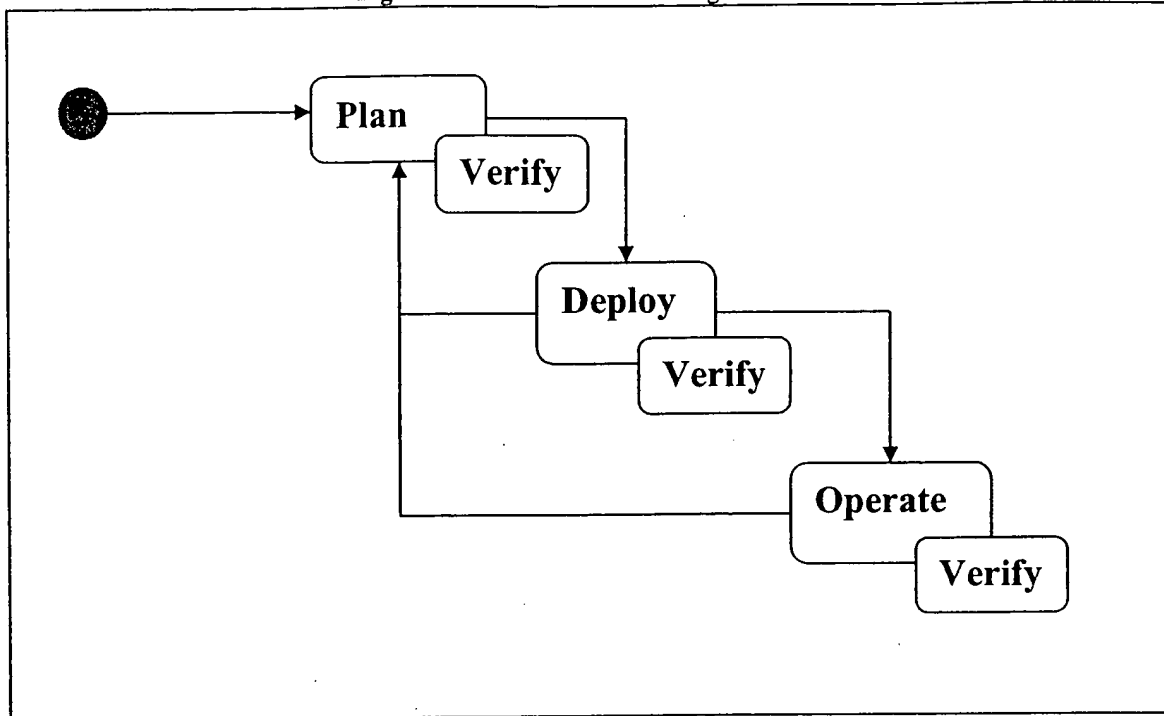
3. *Operate Network*

- In this mode the user performs "normal" day-to-day operation of the system. Also, the user can easily start augmenting and growing the network (which puts them back into the plan-deploy-verify steps.)

4. *Verify Network*

- The user runs a set verification tests on the parts of or the entire network configuration. Verification could really occur during planning, deployment or operation. The user will verify network configuration during planning. The user can also run validation algorithms on a planned network to see problems in the network coverage. Once the network is deployed, the user will verify the installation against the planned (for example, checking if a DP reports a planned number of APs.) The user will also need to easily detect problems in coverage and use. The user is also able to verify the configuration of a device. Any of these functions can be invoked when the network is in operation.

Figure 1: Work Flow State Diagram



1.2.1 APPLICATION FUNDAMENTALS

1.2.1.1 MANAGED VS UNMANAGED DEVICES

The application will provide the user with the ability to manage or unmanage devices. For managed devices, the application will communicate the changes to the device when the user decides to “deploy” the changes. If changes are made to an unmanaged device, the changes are only applied to the local copy of the network configuration and no attempt will be made to communicate with the device on the network. This allows us to provide offline creation of network configurations before the network exists or has IP connectivity.

1.2.1.2 OFFLINE CONFIGURATION CHANGES

The application will provide an offline configuration workflow. That is, the user will make a set of changes to the network configuration within the application and those changes will be recorded in a *change set*. For a set of changes to be applied to the actual network, the user will invoke the “Deploy” option. If the user exits the application without deploying the changes or the changes were applied to devices not actually managed on the network yet, the changes will be stored offline and the next time the plan is opened those changes will be re-applied to the current view of the configuration.

Performance and Fault functions will only be permitted on network configurations that are managed in the network. This means that if the user chooses to monitor the performance of a VLAN not yet deployed the application will inform the user that it is not possible to perform this function until the changes are deployed. Similarly, any fault functions provided by the application will only work if the device is managed and that function applies to a piece of the network configuration that exists on the device in the network.

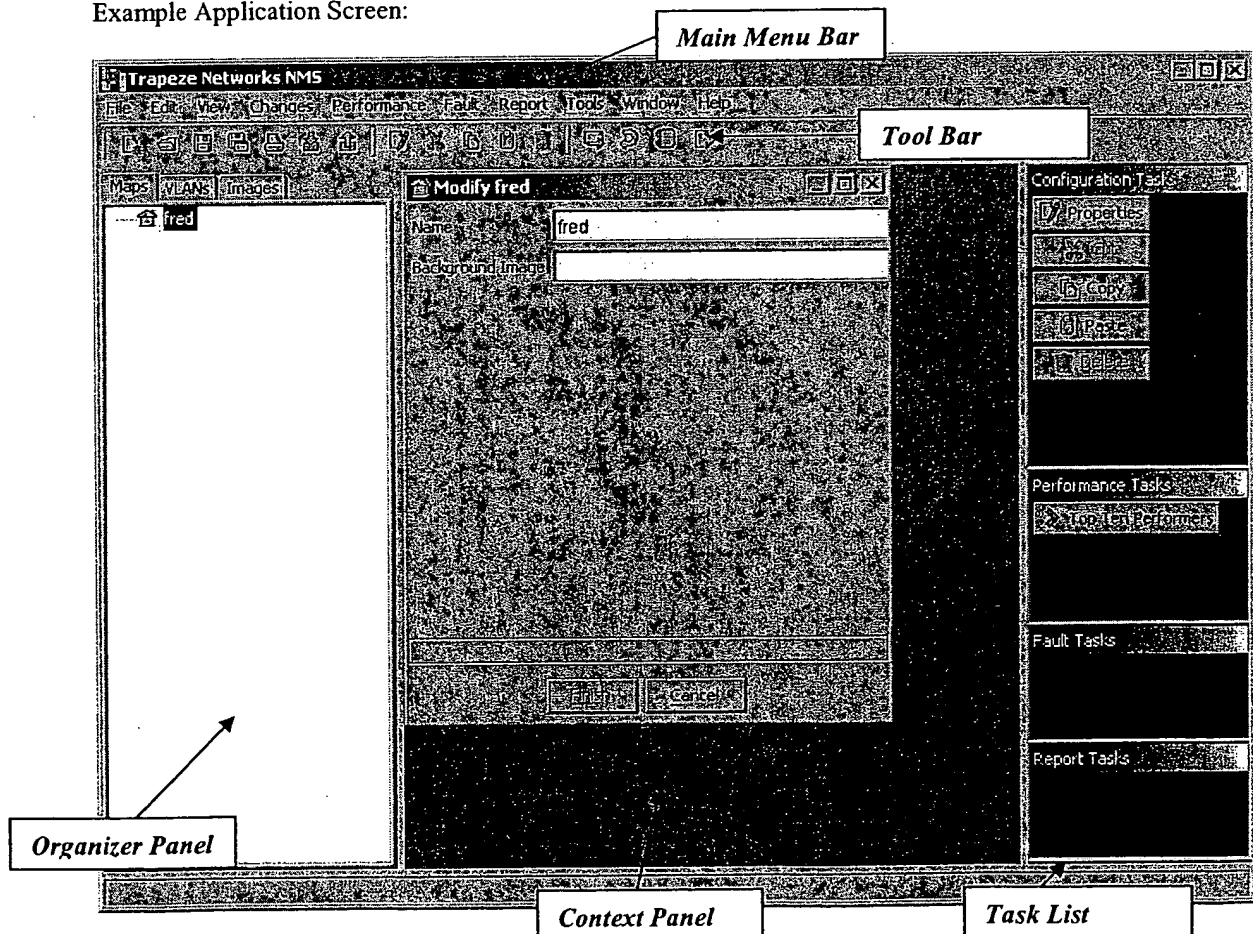
1.2.1.3 VERSIONING SUPPORT

The product will support versioning of the DP/AP product capabilities. That is, it will support multiple versions of the images and their associated capabilities. A device capability can be a difference in configuration model (e.g. new features, extended limits...etc), performance management changes (e.g. additional parameters being added to the data returned for statistics) and fault management changes (e.g. additional parameters being added). As part of DP/AP configuration, an image version will be associated with each device. This version will define the capabilities the product will support from a configuration capability. For our product it is a requirement that the product supports multiple image versions in a single version of the JumpPad product. For 1.0, this will not be a big issue, but with future rollouts of images it is critical that the product be easily adapted to handle the differences in device capabilities.

1.2.1.4 GENERAL LOOK AND FEEL

The application will use the default look and feel of the OS it is installed upon. For Windows XP/2000 this will default to the Windows look and feel. For Solaris, this will default to the Motif look and feel.

Example Application Screen:



The application will consist of:

- Main Menu Bar. This will provide the user the main navigation to the set of functions provided by the application.

- Tool Bar. This will provide shortcuts to the set of functions in the menu bar.
- Organizer Panel. This will provide a tree hierarchy structure to the various views the user can navigate in.
- Context Pane. This will provide the user with a variety of views for configuration/fault/performance of the network.
- Task List. This will provide the user with a set of available functions for the current selection.
- Context Popup Menu. A popup menu will be displayable for each object and will provide the set of related functions for the current selections. The product will support multi-select of objects and therefore this context menu will be based on the first selection rather than all.

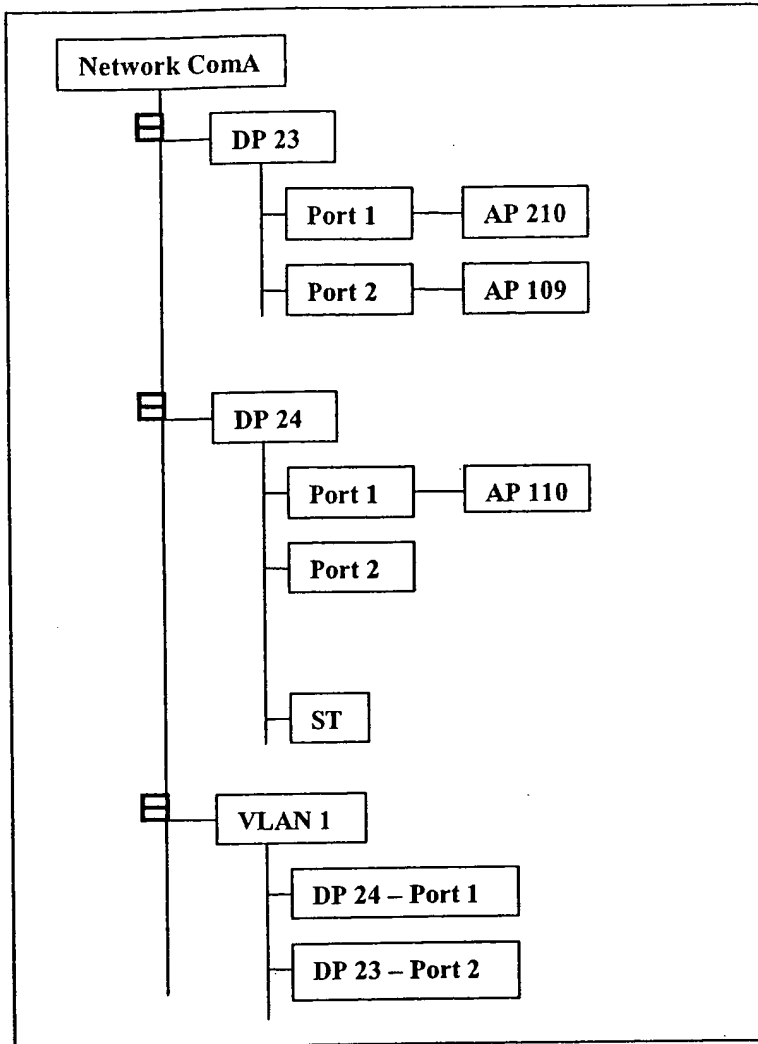
1.2.2 ORGANIZER PANEL

The Organizer Panel will allow the user to easily view the network from either a logical containment view or from a topological view. Ultimately, both views allow the user to see the DPs, APs and other elements of the network. By selecting an element on the panel, the user can:

- Right-click on it to see a list of available operations. This will include a menu option to display a pop-up window with the configuration details of the selected element (this may not make sense for all objects, and will be context-sensitive.)
- Double-click on it to focus the context panel to that object.

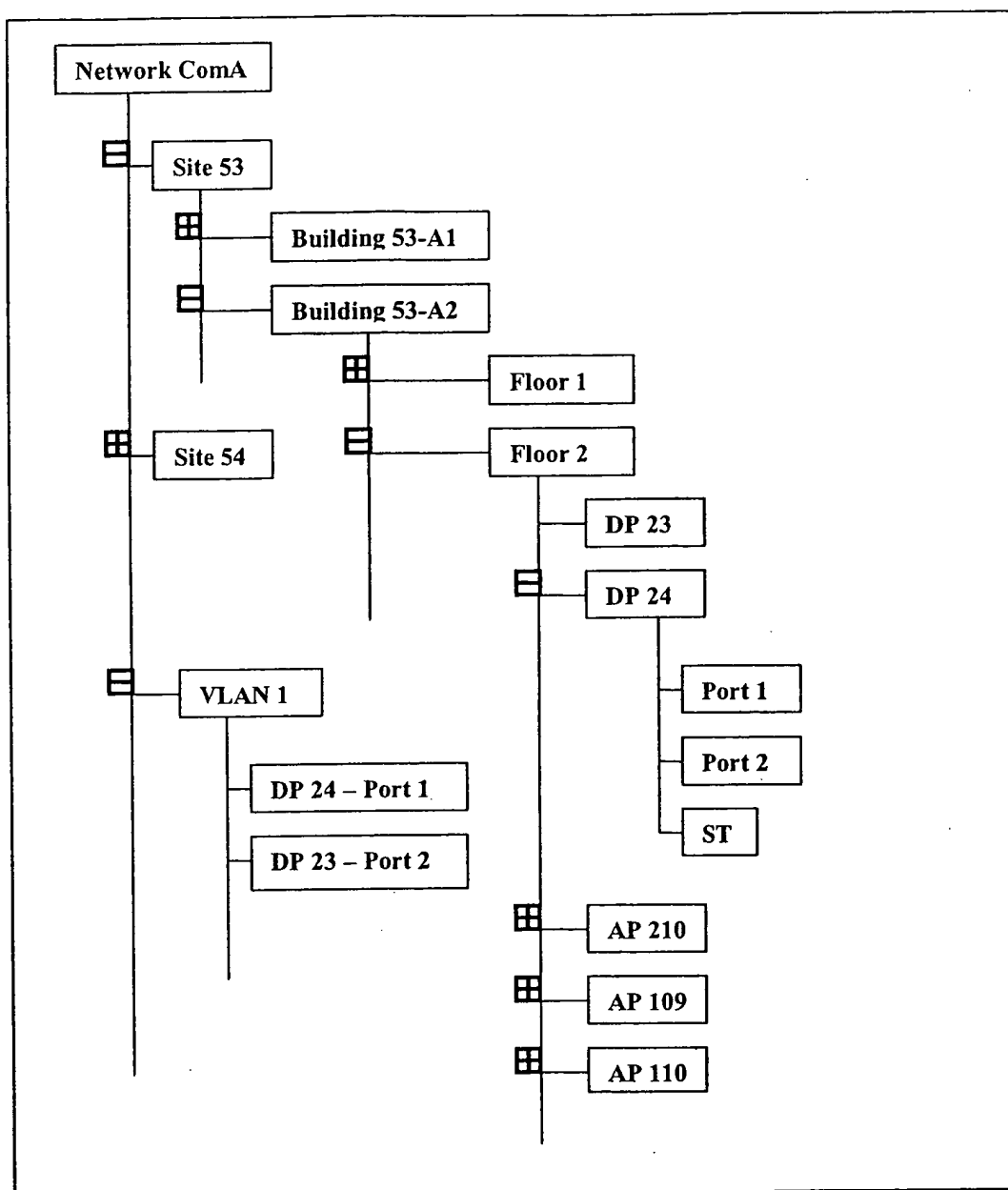
1.2.2.1 LOGICAL VIEWS

A logical view is a containment tree of devices. These do not show any topological elements, like sites, buildings and floors. Using the logical view the user can select a device. To show more information for the device the user can right-click and select a menu option to display its configuration. For example doing this on a port will show if it is connected to an AP, which VLAN it is part of, etc.



1.2.2.2 TOPOLOGICAL VIEW

A topological view of the network shows topological objects like sites & buildings. One point to note: APs may be connected to DPs in a different location (e.g. a different floor or building.) Hence, the topological view displays all elements contained in the topological element. By expanding on a DP, a user will be able to see the APs that it is connected to regardless of their location.



1.2.2.3 VLAN VIEWS

VLANs are seen in both logical and topological views, and can also be accessed using a separate VLAN view.

Since VLANs can span top-level network & topological elements, they are shown directly under a plan in both logical and topological views. For any element, its VLAN associations can also be obtained by using a right-click menu option.

The VLAN view shows only the VLANs under the plan – i.e. all other elements are filtered out.

1.2.2.4 USING THE VIEWS

For any network element, the user can select a menu option to either show the location, or show its logical associations. This allows the user to quickly navigate to the desired information. Also, if the user has selected a network element and then switches modes, the same element will become the focus of the new mode. Hence a user can select an AP in a topological view, and then switch to a logical view to see what DP it is connected to.

If a user select an element in logical or topological view, and then switches to a VLAN view, all VLANs that the device is part of are highlighted in the VLAN tree.

1.2.3 CONTEXT VIEWS/EDITORS

The Context Views/Editors provide various windows that show topology, allow the user to edit parameters for objects, show performance, show alarms...etc.

1.2.4 SELECTION OPTIONS PANEL

The Selection Options Panel provides a quick way for the user to see the options available for the current selection. For example, if the user chooses a port, they can choose to edit parameters, graph performance, show alarms...etc. The selection options panel is just another toolbar with text and icons shown and is context based so that the options available for this object are only shown when that object is selected. This panel is closeable.

1.2.5 MENU BAR

All the Menu items under the menus are context-sensitive. All of the menu items are enabled or disabled based on that what the current selected object is. For example, under the context of "Floor", the "Insert" menu item will only show up the "DPChassis", but not the "Port" submenu item.

1.2.5.1 FILE MENU

The File menu provides the user with a variety of file based functions such as creating new network plans, saving network plans, importing/exporting configuration/image files...etc. This following menu items are currently supported under File menu:

- **New Menu Item**
 - This New menu item will enable the user to start a new network plan. It will prompt the user to enter a new network plan name it is selected.
- **Open Menu Item**
 - Open Menu item provides the user to open an existing network plan, whether it is an active plan or undeployed network plan.
- **Save Menu item**
 - This menu item provides the user to save the existing network plan. If it is first
- **Save As Menu Item**
 - This menu item allows the user to save the network plan to a file on the local disk.
- **Print Menu Item**
 - This menu item allows the user the print the existing network plan or map view.
- **Import Menu Item**
 - This menu item will allow the user to import configuration files defined in CLI or XML format into the system.
- **Export Menu Item**
 - This menu item will allow the user to export device configurations to either CLI or XML format files on the local hard disk.
- **Exit Menu Item**
 - This menu item will exit the Trapeze JumpPad system.

1.2.5.2 *EDIT MENU*

The edit menu provides the user with a variety of current options available for the currently selected object. The following menu items are provided:

- **Insert Menu Item**
 - Insert Menu Item provides the user the ability to add any allowed objects under the current context. For example, if the Floor object is currently selected, the Insert menu item will give the option of inserting DPChassis under the Floor.
- **Properties Menu Item**
 - This menu item allows the user to view or modify the configuration information of that selected object such as Chassis or port.
- **Cut Menu Item**
 - This menu item allows the user to delete an object based on the currently context. For example, delete a DP or AP from the network.
- **Copy Menu Item**
 - This menu item provides the user the capability to do the object cloning. For example, clone the same AP configuration of a selected AP.
- **Paste Menu Item**
 - This menu item provides the user to paste the Copied objects to a different location or hierarchy.
- **Online/offline Menu Item**
 - This menu item provides an easy way to change the state of the Chassis to offline, or online.

1.2.5.3 VIEW MENU

The view menu provides the user with the ability to switch between different views and for the current view provides options to change that view. The following menu items are provided:

- **Map Menu Item**

- Map Menu Item provides the map view of the existing network plan. This menu item is the same tab shown on the left-top of the Organizational Panel.

- **VLAN Menu Item**

- VLAN Menu Item provides the logical view of the VLANs, DPs, and APs, and their connectivity.

- **RF Coverage Menu Item**

This option allows user to view the coverage of a Network plan; this may includes Building, Floor, VLAN, and DP saturation for each site within a Network Plan.

- **Images Menu Item**

- Images View shows a list of DP and AP config files and images and provides a list of functions to manage the image file and provides download to the DPs.

- **Task List Menu Item**

- This menu item provides the user a list of functions to toggle on and off the Configuration Task List on the right side of the Context view.

- **Toolbars Menu Item**

- This menu item provides an easy customization of the Tool Bars and the user can choose to select and deselect the short-cut of each menu on the tool bar.

1.2.5.4 CHANGES MENU

The changes menu provides the user with the ability to save network changes, discard changes...etc. The following options are available in the JumpPad system:

- **Deploy Menu Item**
 - This will allow the user to deploy the network plan to the network devices.
- **Revert Menu Item**
 - This option allows the user to revert the changes back to the previous state of the configuration view before the user made any changes.
- **Review Menu Item**
 - This menu item allows the user to review the changes that they have made in the current view.
- **Verify Menu Item**
 - This option allows the user to verify the network plan for configuration errors. For example, the differences between the actual and planned configuration are identified.

1.2.5.5 PERFORMANCE MENU

The Performance menu allows the user to retrieve and view the Performance and Statistics of the selected object, such as VLAN, Chassis, and port. All options are context sensitive and will show the performance information for a particular selected set of objects. If the user does not select a particular object the option will provide the user with a list of objects that the function may be performed on.

- **VLAN Menu Item**
 - VLAN Menu Item provides the Graph and Chart Statistics for the VLAN.
- **Chassis Menu Item**
 - Chassis Menu Item provides the Graph and Chart Statistics for a selected Chassis.
- **Port Menu Item**
 - Port Menu Item provides the Graph and Chart statistics for a selected port.

1.2.5.6 *FAULT MENU*

The Fault menu allows the user to retrieve and view Fault/Event log of the selected object, such as VLAN, Chassis, and port. The user should be able to select any object such as a DP, or a port, and launch the Fault Viewer for that particular object. All options are context sensitive and will show the fault information for a particular selected set of objects. If the user does not select a particular object the option will provide the user with a list of objects that the function may be performed on.

- **VLAN Menu Item**
 - VLAN Menu Item provides the Fault/Event Viewer for the VLAN.
- **Chassis Menu Item**
 - Chassis Menu Item provides the Fault/Event viewer for a selected Chassis.
- **Port Menu Item**
 - Port Menu Item provides the Fault/Event Viewer for a selected port.

1.2.5.7 *REPORT MENU*

The Report menu allows the user to generate and export the report on the selected object, such as VLAN, Chassis, and port. The user should be able to select any object such as a DP, or a port, and allows the sub selection whether on Configuration, statistics, or event/fault report.

- **VLAN Menu Item**
 - VLAN Menu Item generates the report for the VLAN. User needs to select a particular VLAN and launch the Fault menu. Under this menu
- **Chassis Menu Item**
 - Chassis Menu Item provides the Fault/Event viewer for a selected Chassis.
- **Port Menu Item**
 - Port Menu Item provides the Fault/Event Viewer for a selected port.

Issue: More importantly the user wants to generate report not only on the physical configuration, but also Performance/Statistics.

1.2.5.8 TOOLS MENU

The tools menu provides launch points for the tools we may integrate into the application.

- **Preferences Menu Item**
 - This menu item provides the user to specify User preferences such as Font, Color, and organization of the window etc.
- **Security Menu Item**
 - This menu item allows the user to manage security features, such as user-based authentication.
- **Launch Telnet Menu Item**
 - This menu item provides a launch point for the telnet window against a selected set of devices.
- **Launch Web Browser Menu Item**
 - This menu item allows the user to launch the web browser against a selected set of devices.

1.2.5.9 WINDOW MENU

The window menu provides the user with the ability to control the current windows in the MDI pane

- **Cascade Menu Item**
- **Tile Horizontal Menu Item**
- **Tile Vertical Menu Item**
- **Arrange Menu Item**
- **Close All Menu Item**
- **Help Menu**

The help menu provides launch points into the online help system. In 1.0 this is likely to be a PDF file.

- **About Menu Item**
- **Index/Search Menu Item**
 - This menu item provides the indexing and searching capability of the online Help file.

1.3 PLATFORM SUPPORT

1.3.1 OPERATING SYSTEMS

The following operating systems will be supported in the first release.

- Windows XP
 - Minimum requirements: 256MB RAM, 30MB free disk space, 1024x768 screen resolution, and 24-bit color.
- Windows 2000
 - Minimum requirements: 256MB RAM, 30MB free disk space, 1024x768 screen resolution, 24-bit color
- Solaris
 - Minimum requirements: 512MB RAM, 30MB free disk space, 1024x768 screen resolution, 24-bit color

1.4 SCALING REQUIREMENTS

The system will target the following size of networks:

- 50 DPs
- 1000 APs
- 5000 Users

This is by no means a theoretical maximum, but a single installation of JumpPad should handle this number of devices comfortably.

2 SETUP

Before the user begins planning and operating a network some basic preliminary tasks must be performed. This section describes such tasks.

2.1 INSTALLATION

The product will have various installation options, all of which are supported by Install Anywhere (a commercial Java installation product):

- From CDROM
- From the Web (Web Start will be supported only in post 1.0 release)

All options will download a single installer executable that unpacks itself and then install the product. All installations will install a JVM as part of the installation. We will use Java 1.4 JRE from Sun for all supported platforms. The JRE will be installed as part of the installation and we will not require the user to have a JRE pre-installed.

2.1.1 JUMPPAD INSTALLATION

The JumpPad installer will consist of a single main self-installer that installs all required files for the JumpPad (including JVM). The JumpPad application will be installed under the following default directories under different platforms:

On Windows (2000 and XP) platforms:

\Program Files\Trapeze Networks\JumpPad

On Solaris platforms:

/opt/trapezenetworks/JumpPad/

The installed directory structure under either install directory will be:

| | |
|----------------|---|
| <i>\bin</i> | <i>(with all the executables and startup scripts)</i> |
| <i>\lib</i> | <i>(with all the jar files)</i> |
| <i>\db</i> | <i>(with all the persistent data like dxf files, config xmls etc)</i> |
| <i>\images</i> | <i>(with all the images downloads)</i> |
| <i>\help</i> | <i>(online help files, probably HTML file format)</i> |
| <i>\hpov</i> | <i>(HP Openview integration files including installer)</i> |
| <i>\jre</i> | <i>(The JVM that is required for our product to run)</i> |

We will provide a HP OV plug-in installer that can be invoked by the user manually after installation of the JumpPad. We will provide a check in the main installer that will see if HP OV is installed on the

machine and prompt the user if they want to run the HP OV plug-in installer after the main installer is complete. All files for the HP OV will be installed under our install directory and the plug-in installer will then install from there to the HP installation directories.

2.1.2 JUMPPAD UNINSTALL

JumpPad1.0 will uninstall all the components including 3rd party components if there are any. We will leave zero footprint on the machine if uninstall is successful.

We will recommend in the 1.0 timeframe that all previous versions of the JumpPad (i.e. beta/test versions) be uninstalled before continuing to install the product. We will provide a check in the installer that test for previous installations (on Windows this will be a registry check, Solaris?). If the test finds a previous version the user will be able to continue but we will automatically move everything out of the way before continuing the installation.

Subsequent releases (post 1.0) will provide upgrade utilities for the installation and allow the user to install newer versions (patch/minor or major) on top of previous versions. Particularly patch and minor updates will just upgrade the current installation. Depending on the type of changes being released, this may require conversion of existing database files...etc to the newer release.

2.2 MANAGEMENT PLATFORM INTEGRATIONS

HP Openview will be the only supported network management platform supported in the 1.0 timeframe. The goal is minimal integration providing some basic launch points, custom graphics for our nodes in HP OV and enterprise MIB (i.e. traps) support.

All platforms provide Basic L3 topology maps and are common in Enterprise environments. The installation of our product does not require these products to be in use. However, we will not duplicate L3 topology. Topology of the DP/AP will be covered in a later section.

2.2.1 HP OV LAUNCH POINTS

The application will be launchable from the OVW Tools menu. The menu item will be called "Trapeze JumpPad". The user will not be required to select and particular devices to launch our application. Several scenarios exist:

1. A Trapeze Networks network is already deployed and the user is invoking our application for the first time.
 - a. Upon invocation we will ask the user if they want to import devices from the OV database into our application. If yes, the application will read ALL Trapeze devices from the OV database and show them in a logical view. Upon completion of reading the OV database we will prompt the user for a username/password to read the configurations from the devices on the network.
2. The user has run the JumpPad before either from HP OV or manually invoked and has nothing selected in the OV view.
 - a. In this case, we will start the application in a normal mode (i.e. prompt for new plan/open existing plan...etc)
3. The user has run the JumpPad before and has selected a particular device(s) in HP OV.

- a. In this case, we will search our plan database for those devices and open the particular plan that the device is in. If multiple plans exist with the device, we will ask the user which one to open.

Whenever we read information from the OV database we will gather a device's IP address and hostname as a minimum. More information may be read as we find out more about what is in the database.

2.2.2 HP OV REGISTRATION FILES

To integrate with HP we must provide and install registration files that allow our application to be launchable from the HP OV menus. The registration file for our application will be called "trapezenetworks.ovw" and installed in the following locations:

On Windows: C:\Program Files\HP OpenView\NNM\registration\C

On Unix: /etc/opt/OV/share/registration/C

The contents of the file will be mostly as follows:

```
Application "Trapeze JumpPad"
{
    Description {
        "Trapeze Networks JumpPad",
        "JumpPad for Trapeze"
    }

    DisplayString "Trapeze JumpPad";

    Version "JumpPad 1.0 [REDACTED]";

    Copyright {
        "Copyright (c) [REDACTED] Trapeze Networks Company",
        "All rights reserved"
    }

    Command "trpzJumpPad -shared"

    MenuBar <100> "Tools" _T
    {
        <5> "Trapeze JumpPad" _M CONTEXT "AllContexts || isIP"
        f.action "trapeze-JumpPad";
    }

    Action "trapeze-JumpPad" {
        MinSelected      0 ;
        MaxSelected      1 ;
        SelectionRule     (isSNMPSupported || isSNMPProxied) ;
        NameField         "IP Hostname", "IP Address", "Selection Name";
    }
}
```

We will also provide enterprise MIB integration and this will require us to copy the necessary MIB files into the appropriate HP OV directory containing the MIBs. **Details TBD.**

We will also provide custom icons to show Trapeze Networks devices in the HP OV maps and this will require installation of symbol files...etc into HP OV directory structure. **Details TBD.**

2.2.3 SYNCHRONIZING HP OV STATE

| | |
|---------------------------|--|
| Pre-conditions | HP OV is accessible. JumpPad is installed and JumpPad plug-in to HP-OV is installed. |
| Post-conditions | JumpPad is configured to sync with HP OV. |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects the Preferences menu option. The preferences dialog will have a HP OV integration panel with various choices. 2. JumpPad will have the following option: <ol style="list-style-type: none"> a. Sync New Nodes. This option will switch on/off our application checking for new Trapeze nodes discovered in HP OV. This option only applies when the application is running already and HP OV discovers a new node and sends an event to us saying a new device is discovered. b. Sync Node Status. This option will switch on/off our application opening a connection to OV on startup. If on, our application will open a connection to the OV database and register interest in events associated with the Trapeze device status. OV provides callback mechanisms so that when events occur (status change) we can receive the event asynchronously. Upon receipt of a node status update from HP OV we will color our device nodes with the same color coding as shown in the HP OV map. |
| Exceptions | |
| Alternate Flows | |
| Notes & Issues | <ul style="list-style-type: none"> • The HP OV integration can be done at any time. |

2.3 CONFIGURING USER-BASED AUTHENTICATION

The JumpPad supports a user-based authentication policy that leverages the underlying platforms user management scheme. By default this policy is disabled.

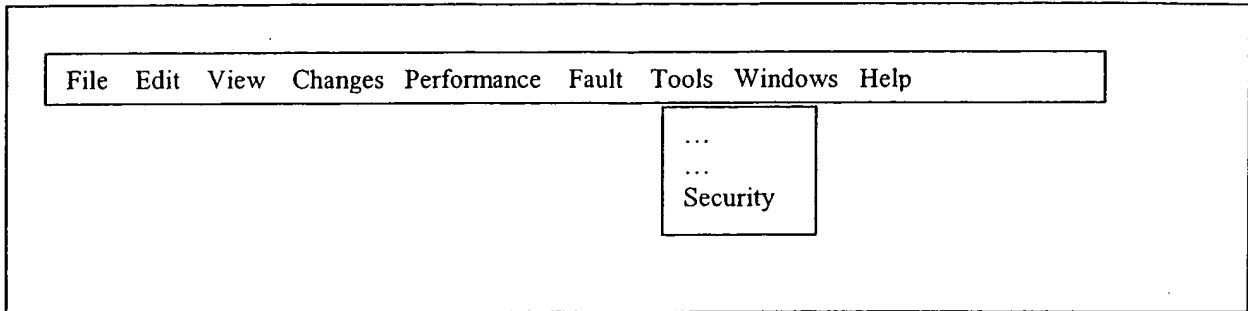
As part of the JumpPad, an administrative user is allowed to turn on the user based authentication and to define a set of users that can use the JumpPad on that system.

2.3.1 USER BASED AUTHENTICATION

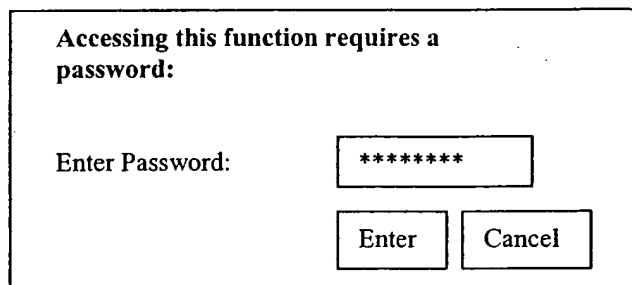
| | |
|---------------------------|---|
| Pre-conditions | JumpPad is installed |
| Post-conditions | The user-based authentication feature is turned on and a JumpPad user list is created for the system. |
| Main-Flow | <ol style="list-style-type: none"> 1. The Administrator invokes the User Control function. A password may be required to access this function, based on prior settings (see below.) 2. The Administrator enables user-based authentication. 3. The administrator sets a password for subsequent management of user-authentication. 4. The Administrator defines one or more system user names that are allowed to use the application. 5. The User Control application encrypts the user names and stores them as Java system properties. |
| Exceptions | 2a. The Administrator quits: <ol style="list-style-type: none"> 1. The application informs the administrator that no users are defined, and prompts them to either define a user or turn-off user based security. |
| Alternate Flows | 2a. The Administrator disables user-based authentication: <ol style="list-style-type: none"> 1. No user authentication is performed in future runs of the application. 3a. The Administrator does not set a password for managing user-based authentication: <ol style="list-style-type: none"> 1. No password check is done when the User Control function is invoked. 4a. The Administrator deletes one or more system user names from the existing list. <ol style="list-style-type: none"> 1. The deleted user will not be able to subsequently run the application. |
| Issues & Notes | |

JumpPad will provide a menu option to access the user-based authentication security feature:

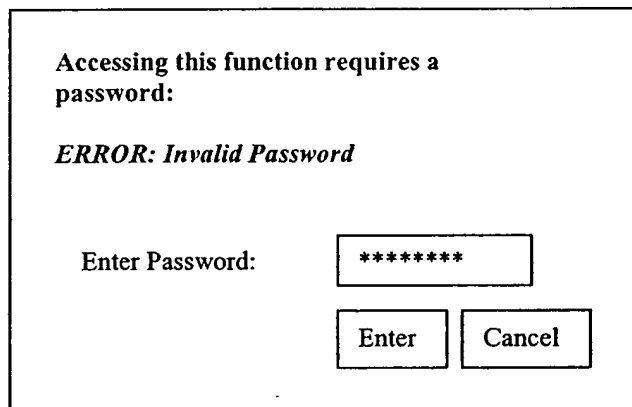
- *Menu Option: Tools -> Security*



This feature can be protected by a password. By default there is no password. Only if a password has been previously set, the user will be prompted to enter it.



If the password does not match, the user will be informed of this error and re-prompted for the password:



Next, the user is then presented with a single screen that allows the management of user-based authentication. Here, the user can:

- 1) Turn the user-based authentication on or off.
- 2) Turn the password protection of user-based authentication on or off.
- 3) Set a password (if password protection is enabled.)
- 4) Add or delete user names that can access the application.

The diagram shows a user authentication interface. At the top, there are two rows of controls: 'User Authentication:' and 'Set Password:'. Each row has a radio button labeled 'On' (which is selected) and a radio button labeled 'Off'. Below these are two text input fields, one for 'Password:' and one for 'Re-enter:', both containing seven asterisks. At the bottom, there is a 'User List' window. This window contains a list of users: 'User 1', 'User 2', 'User 3', and 'User N'. The 'User N' entry is highlighted with a dark background. To the left of the list are two buttons: 'Add' and 'Delete'. A vertical scrollbar is on the right side of the list.

[ALLAN: By definition, setting a password turns password security on, I don't believe having an additional toggle button to turn this on/off helps, it is redundant]

2.4 APPLICATION STARTUP

2.4.1 STARTING JUMPPAD

| | |
|------------------------|---|
| Pre-conditions | JumpPad software is installed |
| Post-conditions | JumpPad is started |
| Main-Flow | <ol style="list-style-type: none"> 1. User can start JumpPad using any of the following options: <ul style="list-style-type: none"> • From command line: by typing in the application name • By double-clicking a desktop icon or selecting a desktop menu option. • By using a HP OV launch-point 2. JumpPad checks security policy to see if user authentication is enabled. 3. If user-based security is enabled: <ol style="list-style-type: none"> a. JumpPad retrieves security data b. JumpPad authenticates the user against a pre-defined list of allowed users as |

| | |
|---------------------------|---|
| | <p>4. JumpPad retrieves the user's preferences. If none exists, the JumpPad will just use the defaults built into the product. As soon as a preference is changed the JumpPad will save the complete set to the user's specific directory.</p> <p>5. JumpPad gives the user options to:</p> <ol style="list-style-type: none"> Open an existing network plan. If the user had previously used the JumpPad the JumpPad will display a list of "recently opened" plans. Start a new network plan. |
| Exceptions | |
| Alternate Flows | |
| Issues & Notes | |

On starting up JumpPad, the user is prompted with a dialoge box, as follows:

The dialog box contains the following elements:

- Radio Button 1:** Labeled "New Network Plan" with the instruction "Enter Name" below it. A text box to the right contains "BuildingA-Floor1".
- Radio Button 2:** Labeled "Open Network Plan" with the instruction "Select Network" below it. A list box to the right is titled "Existing Plan List..." and contains the items "BuildingA-Floor1" and "BuildingB-Floor2".
- Buttons:** "Continue" and "Cancel" buttons at the bottom.

This box is shown in front of the main application window. If the user hits cancel, the main window stays running, with only the *MENU: File -> New* and the *MENU: File -> Open* functions accessible.

2.4.2 AUTHENTICATING USERS

| | |
|------------------------|---|
| Pre-conditions | An administrator has built a JumpPad user list with <u>Use Case – Build User List</u> |
| Post-conditions | User is authenticated and allowed to use the JumpPad. |
| Main-Flow | <ol style="list-style-type: none"> JumpPad application retrieves allowed user list (which is stored as Java system properties.) JumpPad application uses the Java authorization package to query the system |

| | |
|-----------------|---|
| | <p>about the current user.</p> <p>3. If the current system user is on the allowed user list, the user is authenticated.</p> <p>4. If the current system user is NOT on the allowed user list, the authentication request is failed.</p> |
| Exceptions | <p>1a. Empty user list</p> <p>1. Authentication request is failed.</p> |
| Alternate Flows | |
| Issues | <p>a. Should authentication be done at a more granular level? E.g. for function groups?</p> <p>b. Are there user levels/privileges: read-only, change, etc.</p> |

For valid users there is no password to enter, when they start JumpPad. If JumpPad detects an invalid user, it will inform the user as follows:

ERROR: The user account (User 1) is not configured to use JumpPad. Please inform the JumpPad administrator or re-try with a different account.

Ok

3 PLAN

Planning involves creating new network plans or working with existing ones. A network plan is a collection of network device definitions, topological definitions, maps and background image files.

The user has a number of different options for defining and importing data into a network plan. These are described in detail below:

3.1 NETWORK PLANS

3.1.1 STARTING A NEW NETWORK PLAN

| | |
|---------------------------|--|
| Pre-conditions | JumpPad is installed |
| Post-conditions | User has created & saved a new network plan. |
| Main-Flow | <ol style="list-style-type: none"> 1. User starts JumpPad. 2. JumpPad tool authenticates user with <u>Use Case – Authenticate User</u> 3. JumpPad tool places the user into a blank network plan (sort of like being in Document1 when you open Word.) 4. User does <i>any</i> of the following (in any order) until the plan is complete or ready to be saved : <ul style="list-style-type: none"> • User defines topology objects – <u>#Use Case – Define Topology Objects</u> • User defines & configures devices – <u>#Use Case – Define & Configure Devices</u> • User imports a .dxf file and defines topology objects from it – <u>#Use Case – Import .dxf File</u> • User imports an HP OV device list and defines devices from it – <u>#Use Case – Import HP OV Device Discovery</u> • User can import data from a device - <u>#Import from Device.</u> 5. User saves the network plan. 6. The JumpPad puts the plan into a persistent store or disk. |
| Exceptions | |
| Alternate Flows | <ol style="list-style-type: none"> 3a. User opens an existing network plan. <ol style="list-style-type: none"> 1. Proceed to <u>Use Case – Work On A Saved Network Plan</u> |
| Issues & Notes | <ul style="list-style-type: none"> • Not too sure about the Word model. It could be irritating to always start with a blank document – but this could of-course be a user configurable. Will users be constantly switching between a large set of models/files, or will they typically only use one. • Do we need to version the files? With a FS the user can simply rename. |

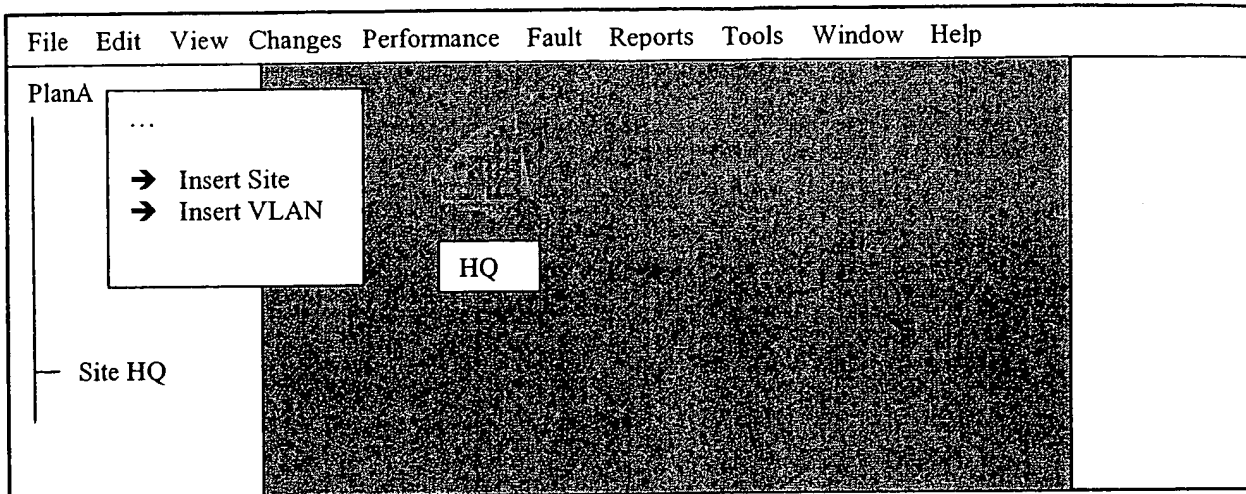
3.1.2 DEFINING TOPOLOGY OBJECTS

| | |
|---------------------------|---|
| Pre-conditions | User is working on a network plan and wants to define/modify the topological view of the plan. |
| Post-conditions | User has successfully defined/modified the network topology. |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects any one of the following objects (from a menu or palette): <ol style="list-style-type: none"> a. Site b. Building c. Floor d. Walls 2. User places object on the drawing area. 3. User configures the attributes of each object: name, location (co-ordinates?), dimensions, any obstruction characteristics (e.g. a thick wall), etc. 4. User repeats steps 1-3 till the topology is defined as needed. 5. User can associate the topology with devices as described in <u>#Use Case – Define & Configure Devices</u> |
| Exceptions | |
| Alternate Flows | |
| Issues & Notes | |

The user makes use of the Organizer Panel (or Menu Bar) and the Context Editor to add topological objects to the plan. By right-clicking on an element in the Organizer Panel, the user can insert a new element. The same operation can also be done by using the following option from the Menu Bar:

MENU: Edit -> Insert

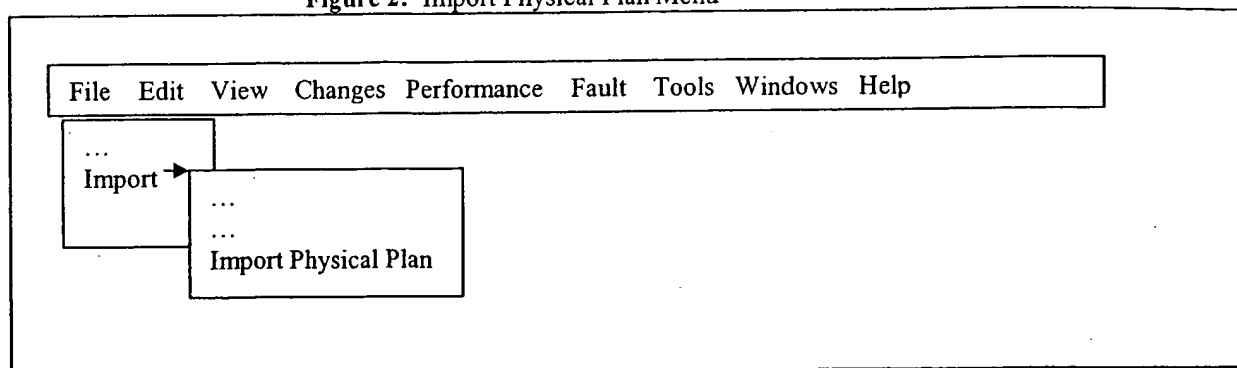
Based on the element selected, a different list of devices will be shown for insertion.



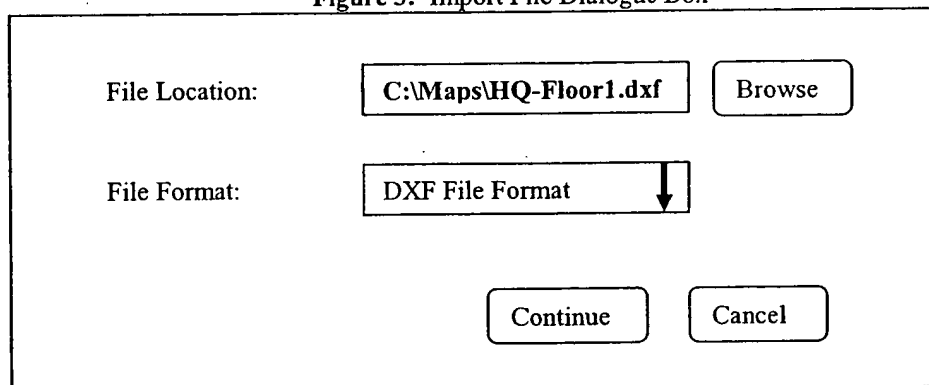
3.1.3 DEFINING PHYSICAL PLANS

| | |
|---------------------------|--|
| Pre-conditions | User has started a new network model, or working on an existing model. |
| Post-conditions | User has imported plan information (e.g. from a .dxf file) into a network model. |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects option to load a .dxf file (or other network model file.) 2. JumpPad prompts user for file name/path. 3. JumpPad opens file, and reads the data from it. 4. The User instructs the JumpPad to associate a .dxf with a topological object (is it only a floor?), or to create a new topology object for the .dxf file. 5. When selected, JumpPad displays the .dxf file as a background to the topology object. 6. User would typically continue to either: <ul style="list-style-type: none"> • <u>#Use Case – Define Topology Objects</u> • <u>#Use Case – Define & Configure Devices</u> |
| Exceptions | <ol style="list-style-type: none"> 4a. The topological object already has an associated .dxf file. <ol style="list-style-type: none"> 1. JumpPad replaces existing file with new one (after a warning?) |
| Alternate Flows | |
| Issues & Notes | <ul style="list-style-type: none"> • Is the .dxf more of a drawing/background, or does it give us more information like the list of objects and their co-ordinates? If so, then the user can be shown this list and asked to map them to topological elements. |

The MENU: File -> Edit -> Import option will allow the user to import a physical model.

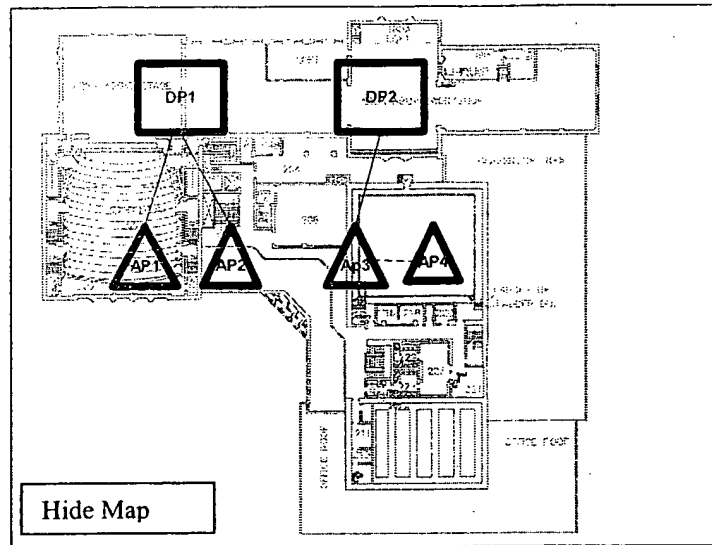
Figure 2: Import Physical Plan Menu

This will open a dialogue box which allows the user to enter the file location. The user can invoke the browse function to see browse their directories for a file. When a file is selected, if the file extension is recognized its type will be shown. Otherwise, the type will be listed as “unknown” and the user can manually set it to the desired type.

Figure 3: Import File Dialogue Box

After the topological file has been imported, and the topology objects are defined, the user can start associating network devices with various topology objects.

Figure 4: Topological Display in Context Panel



3.1.4 DEFINING & CONFIGURING DEVICES

| | |
|------------------------|--|
| Pre-conditions | User is working on a new or existing network model and wishes to define devices in it. |
| Post-conditions | User has defined one or more devices. |
| Main-Flow | <ol style="list-style-type: none"> User adds a DP to the network plan by selecting a UI menu option. <ul style="list-style-type: none"> The DP can be added under a topological element (in a topology view) or directly under the plan in a logical view. If the DP is added under a topological element, it automatically uses that element to fill-in its location attributes. If the DP is added under a plan, its location attributes are empty. These can be manually filled in, or the DP can be later associated with a topological element. User defines an IP address for the DP. The User selects a software image version for the DP. Along with the software image a default configuration will be associated with the DP. User fills-in the rest of the required configuration data (what is this?) for the DP. Optionally, the user manually adds location information for the DP, or associates the AP with a topology object. Optionally, the user instructs the JumpPad to load a default/template configuration for the DP. The choices for this may be based on the software version of the DP. User plans AP deployment: <ol style="list-style-type: none"> User graphically selects a desired coverage area that includes one or more DPs. The user then supplies the bandwidth, etc (what is the precise list?) for |

| | |
|---------------------------|--|
| | <p>the coverage area.</p> <ul style="list-style-type: none"> c. JumpPad will generate an ideal coverage configuration, and show where APs should be placed. d. User can move the APs around and check coverage attributes. <p>8. User configures one or more APs on the DP.</p> <ul style="list-style-type: none"> a. User instructs the JumpPad to load a default/template configuration for the AP. b. User fills in other required configuration information. <p>9. User repeats the above steps until the network model devices are configured as needed.</p> <p>10. User can choose to “deploy” or “manage” the device as described in REF.</p> |
| Exceptions | |
| Alternate Flows | <p>7-8a. User manually defines AP location:</p> <ul style="list-style-type: none"> 1. User points to an area and instructs JumpPad tool to locate an AP there. 2. User enters in location information. 3. Continue with 11 in the main-flow. |
| Issues & Notes | <ul style="list-style-type: none"> • Do we need a default/template configuration file? Is there a choice or is it preset by the software release? • As the devices are being built, the logical GUI pane can simply show a containment tree of DPs and APs. If the user prefers a topological view, devices can be shown underneath buildings/floors, etc. |

When the User adds a new DP, a DP creation box will be used to enter in the DPs information. At this point, the User can choose to import data from the DP (assuming it is already deployed) or can choose to continue to select a software version, and enter in any necessary configuration data.

Figure 5: DP Creation

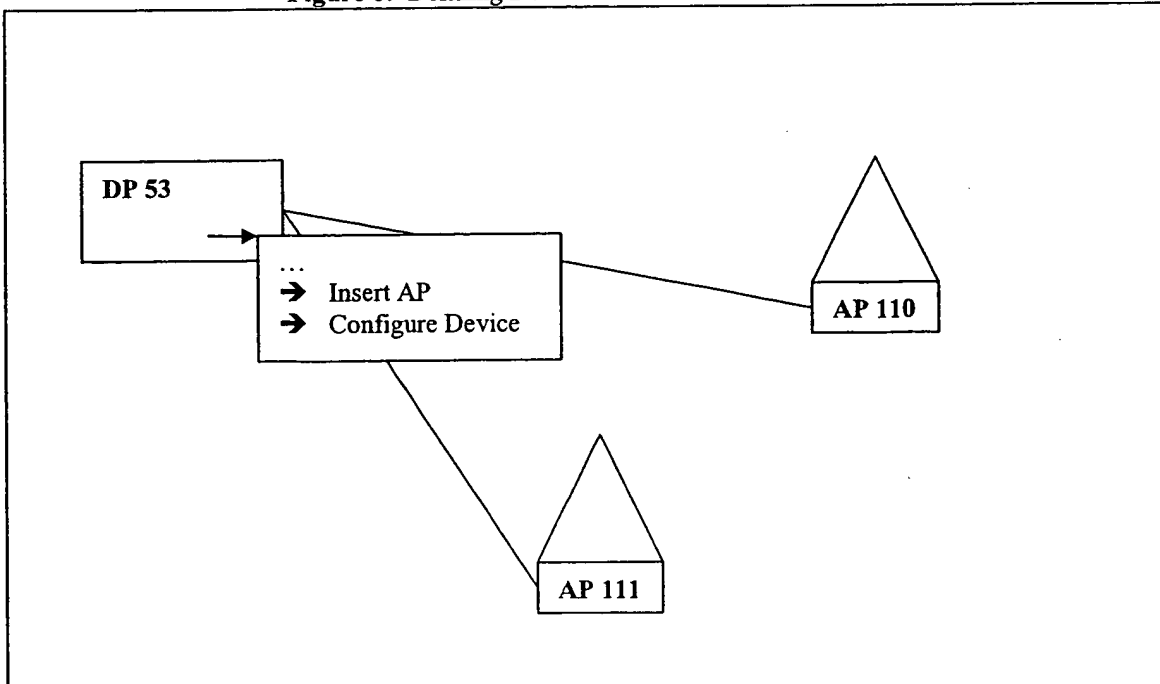
Name:

IP:

Software:

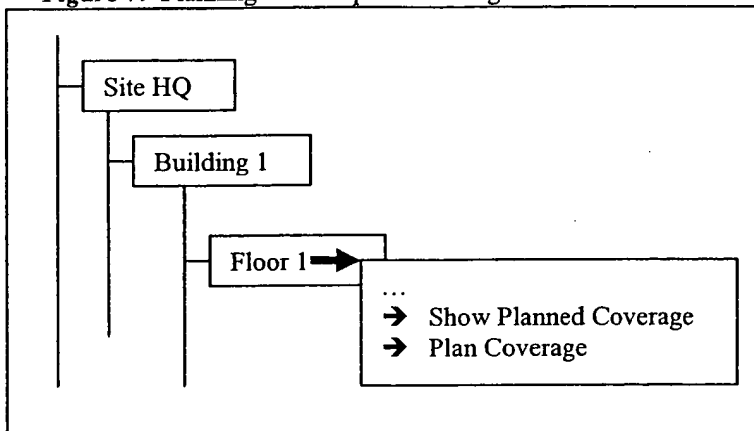
Management State: ☐ Managed ☒ UnManaged

The user is able to add devices from either the Organizational Panel or the Context Panel. The user can move around (drag and drop) the objects in the Context Panel. If the user has either defined a topology, the location attributes of the object will be updated. Alternatively, the user can manually update the location attributes, and the device will be automatically moved.

Figure 6: Defining Devices in the Context Panel

To validate the coverage, the User must select a coverage area. This could be an existing topology object (the user selects the object and then selects a menu option from it), or could be a coverage area that the User manually draws. The User can then select an option to run show the current coverage on the selected area or topology object. Using the supplied configuration data, JumpPad will display a coverage map. The user can then tweak the shown configuration as needed. If desired the user can save the changed configuration.

Figure 7: Planning Menu Options on Organizational Panel

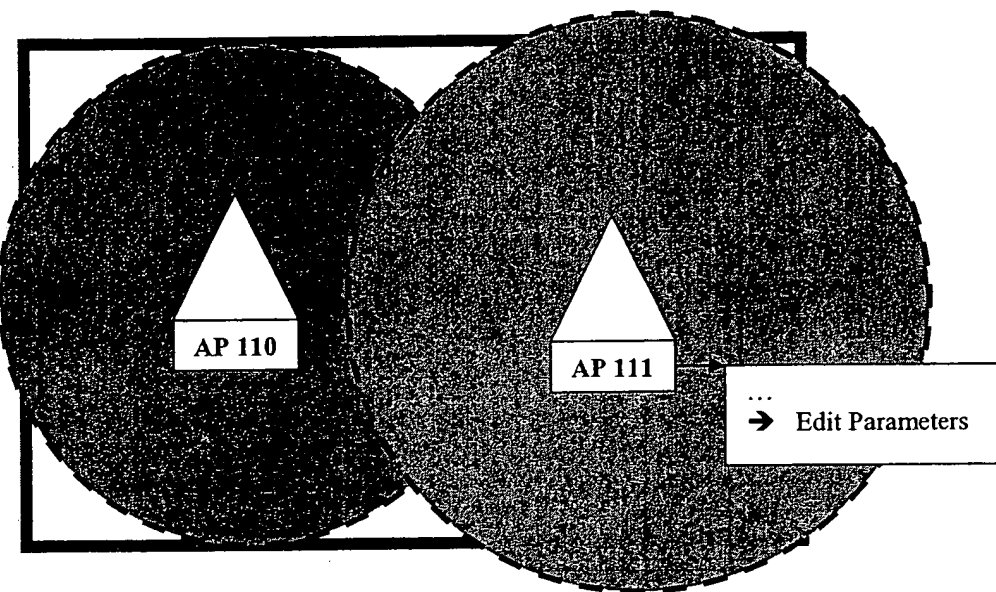


By selecting a topology object or pre-defined coverage area, the user can also select an option to run a planning algorithm. In this case the user supplies the desired coverage requirements (e.g. desired bandwidth), and lets the application suggest a configuration. The user can tweak the configuration as needed, and save the configuration changes.

Note that to actually apply the changed configuration to the network the user must use the normal deployment procedures (described in a later section.)

Figure 8: Planning Window

| | |
|---|---|
| <p>Current Coverage:</p> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 5px;"> 89% 5.5 Mbps </div> | <p>Desired Coverage:</p> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 5px;"> 100% 7 Mbps </div> <div style="margin-top: 10px; text-align: center;"> <div style="border: 1px solid black; padding: 5px 20px; display: inline-block;">Generate Plan</div> </div> |
|---|---|



...
 → Edit Parameters

Recalculat

Save

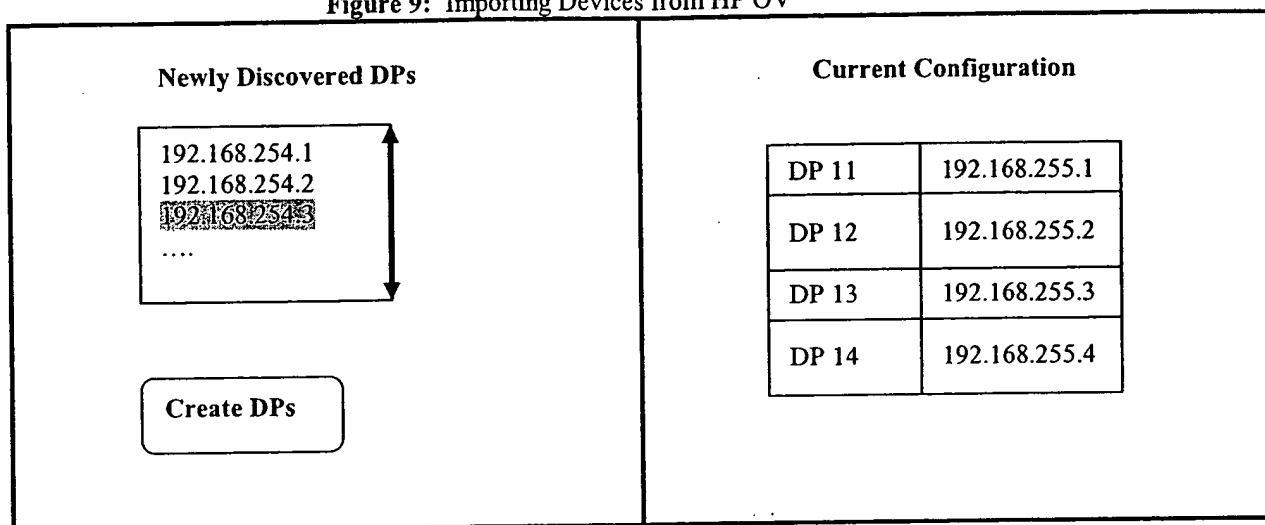
Cancel

3.1.5 IMPORTING HP OV DEVICE DISCOVERY

| | |
|------------------------|---|
| Pre-conditions | User is working on a new or existing network plan. The user has previously configured the JumpPad to cooperate with an HP OV installation. |
| Post-conditions | User has imported devices discovery data from HP OV, and has associated devices with it, |
| Main-Flow | <ol style="list-style-type: none"> 1. The user selects a menu that lists possible HP OV interactions and choose an "import devices" function. 2. JumpPad queries the HP OV installation, and collects a list of DPs and IP addresses. 3. JumpPad shows this list to the user. 4. JumpPad will also display the current configuration of the plan. 5. The Use can create a new DP from a discovered IP address. The user will then be prompted to configure the device, or to import configuration from the device. |

| | |
|---------------------------|--|
| Exceptions | |
| Alternate Flows | |
| Issues & Notes | <ul style="list-style-type: none"> Need an easy way to batch-create DPs from a set of IP addresses. |

Figure 9: Importing Devices from HP OV



3.1.6 WORKING ON A SAVED NETWORK PLAN

| | |
|---------------------------|--|
| Pre-conditions | A user has previously worked on and saved a network plan. The plan can be in any state i.e. it may or may not have been used to manage a network. |
| Post-conditions | User has opened and is using a previously saved plan. |
| Main-Flow | <ol style="list-style-type: none"> 1. User asks JumpPad to load an existing network plan. 2. JumpPad prompts user for path/name. This will be one logical name, and not a whole list. 3. JumpPad closes the current plan (if one is open), and starts loading the new plan. 4. The loading includes opening all files (including maps etc.) associated with the plan. 5. User typically starts work on modifying/extending the plan, or simply uses it to start managing devices. |
| Exceptions | |
| Alternate Flows | |
| Issues & Notes | |

4 DEPLOY

Once the user has built the plan, and performed certain rules verification of the plan, he is ready to deploy the plan and make the configuration changes to the network. There are still two preliminary steps to perform before the user can start the deployment.

- 1) Physical Device Setup: this will provide the minimum IP connectivity to the DPs and APs
- 2) Specify software image version for the DP and APs.
- 3) User hits "Deploy" to deploy the network plan to the device.
 - a. JumpPad will run a list of Verification Rules based on the configuration change sets.
 - b. JumpPad Push the configuration and images to the device.

4.1 PHYSICAL DEVICE SETUP

Before JumpPad can deploy the network plan created in the previous section the network manager must perform the following steps to enable basic IP connectivity to the network devices.

4.1.1 DP SETUP

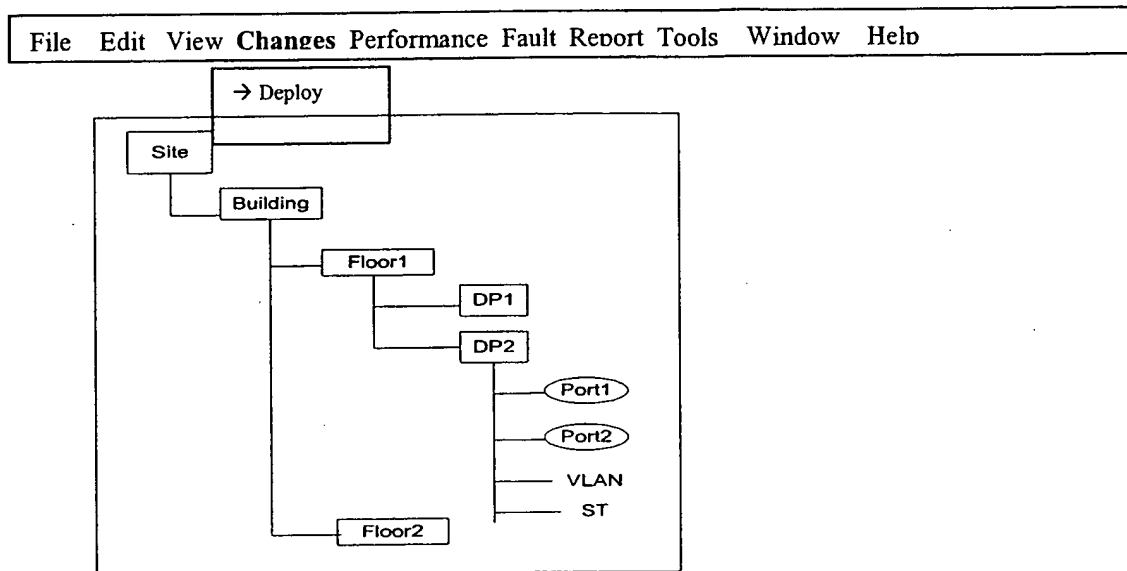
- At the console, the user configures the IP address and default route
 - a. Future will be to get this automatically via DHCP
 - b. Assumptions:
 - i. Has default image for APs on the file system
 - ii. By default the switch is secure (i.e. doesn't pass any traffic)
 - iii. By default it is a flat bridge
- DNS parameters may need to be configured
- Either via Telnet or at the console the user configures:
 - a. SID
 - b. Certificate Authority certificate(s)
 - c. Authentication Methods
 - i. Local/RADIUS/TACACS+ setup

4.1.2 AP SETUP

- ZERO config required.
- Downloads image from DP on boot up.

4.2 DEPLOY CHANGES TO NETWORK

Once the network has basic connectivity JumpPad can distribute the configurations and images constructed as part of the planning process.



By clicking on the "Deploy" option, a "Deploy" wizard will be launched as the following UI.

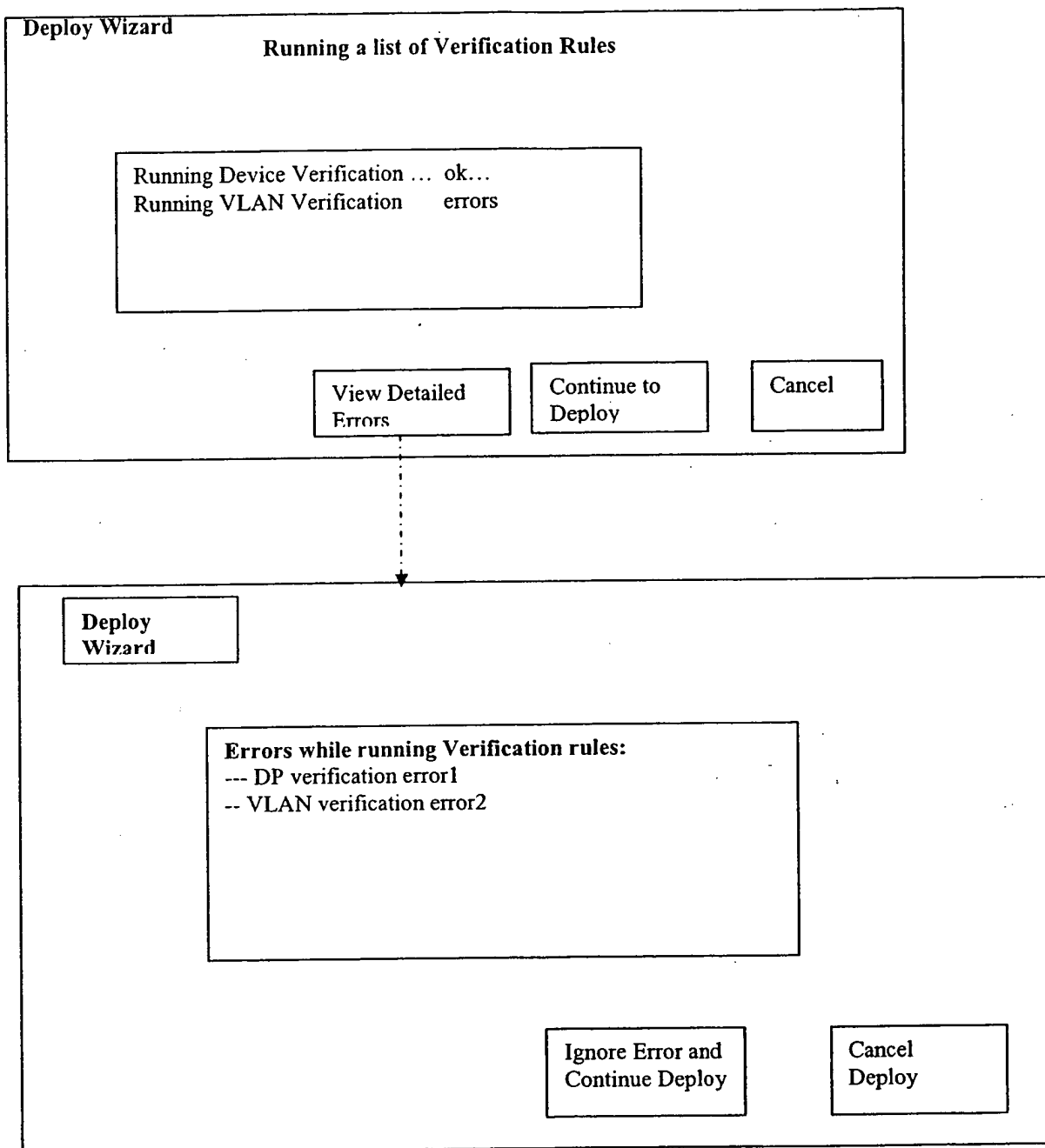
4.2.1 REVIEW DEVICE CHANGES BEFORE DEPLOYMENT

Once the user has hit "Deploy", JumpPad will display a list of changes the user has applied to the network, and asks the user if he wants to proceed. The user reviews the changes, and if there are any corrections or further changes that need to be done, he can cancel the deployment and go back the configuration changes again, and hits "Deploy" later on. The following is the UI for showing the list of configuration changes:

| Deploy Wizard | |
|-------------------------------|--------------------------|
| Network Config Change Summary | |
| Device Name | Configuration Change Set |
| DP1 | Change1 Change2 |
| DP2 | |
| DP3 | |

4.2.2 DEPLOY CONFIGURATION CHANGES

| | |
|------------------------|---|
| Pre-conditions | User has built a network plan that consists of one or more devices. The devices have been physically installed and are in managed state. |
| Post-conditions | The devices are deployed and active. |
| Main-Flow | <ol style="list-style-type: none"> 1) User selects a network plan, chooses "Changes" menu and select "deploy" submenu. JumpPad will bring up a Deploy wizard and display a list of the changes summary currently outstanding in the network plan. 2) If the user chooses to say "Deploy Now", JumpPad will bring up the next Verification dialog. 3) JumpPad will run verification rules on any changes to ensure no errors occur. Need to show dialog showing this running. If errors discovered the user has to manually select to continue (i.e. override) or cancel the deploy action. 4) If user chooses to continue Deploy. JumpPad will start making the deployment changes to the devices. For each device in the network, JumpPad does the following: <ol style="list-style-type: none"> a. JumpPad will check if the device is in <i>Managed</i> State, <ol style="list-style-type: none"> i. If the "sync" state is "true", JumpPad will apply the configuration change and/or images set to the device ii. If the "sync" state is "false", JumpPad will first get the configuration changes from the device, and then apply the config change set on top, and then send the config changes to the device. b. Else if the device is in <i>Unmanaged</i> State <ol style="list-style-type: none"> i. JumpPad will only apply the change to the local cache and db copy. 5) JumpPad display a dialog for all devices being deployed to and the progress for each device. 6) If there are any error messages that coming back from the device, user will be able to view the error status and take appropriate actions such as Rollback (revert). |
| Exceptions | |
| Alternate Flows | |
| Issues | |



If the user clicks on View Detailed Errors, the above UI screen will be displayed. Users has a choice of ignoring all the errors, and continue to deploy; Or user can cancel Deploy now. User can go back to make the modification of the configuration changes, and then later hit "Deploy" again to rerun the Deploy wizard.

4.2.3 DEPLOY ERROR HANDLING AND ROLLBACK

Once the user has hit the deploy action after the verifications, the following dialog will show up to show the progress of the deployment. Once a deployment is in progress, user can not cancel the action in the middle.

| | |
|---|--|
| Plan1 Deploy Progress bar | |
| <div>Deployment is in progress for Plan1</div> <div> <div></div> </div> <div>80% complete...</div> <div><<Details>></div> | |

If there is any errors occur in the deployment, user can select Details and he will be able to view the error status and details for the deployed devices. The following UI will be launched if the user clicks on "Details":

| Plan 1 Deploy Status | | |
|-------------------------------------|-----------|------------------|
| Device Name | State | Status/Msg |
| DP1 | Unmanaged | Skipping.. |
| DP2 | Managed | Success |
| DP3 | Managed | Failed |
| <div>Revert Back All Changes?</div> | | <div>Close</div> |

JumpPad will allow the user to revert back "ALL" the configuration changes. If the user chooses to "Revert back", JumpPad will use the previous saved configurations (last saved) for all devices and apply that to the device again.

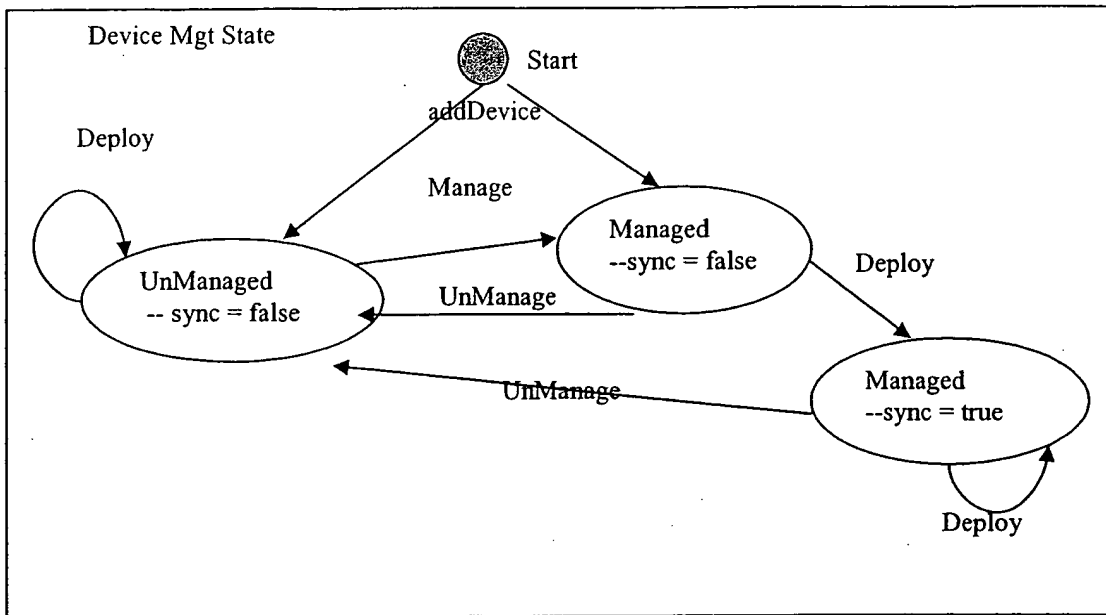
| | |
|------------------------|--|
| Pre-conditions | User has done deployment for one or more devices in the network and there are errors during the deployment. |
| Post-conditions | Error conditions are handled and the devices configurations are reverted if the user chooses to. |
| Main-Flow | <ol style="list-style-type: none"> After the user has hit "Deploy", there will be a progress dialog that comes up and display the progress of the deployment. User can not cancel the Deploy action in the middle but can view the status of the |

| | |
|------------------------|--|
| | <p>deployment and possibly errors that occurred.</p> <ol style="list-style-type: none"> 3. User clicks on “Details” button, a list view of all the devices that are deployed and their status. 4. If there are any failure during deployment: <ol style="list-style-type: none"> a. User can choose to say “Revert Changes” and JumpPad will prompt the user “Are you sure you want to revert back ALL the configuration changes? If the user says “yes”, JumpPad will revert back the all the changes that have applied to the device. JumpPad will use the last saved configuration, and send that down to the device. b. If the user did not choose “Revert Changes”, JumpPad should save all the changes of the device (change failed) <ol style="list-style-type: none"> 1. User can go back and fix the device problem, 2. User goes to JumpPad to perform “deploy” again. JumpPad will send down the Config changes to the device again. |
| Exceptions | |
| Alternate Flows | |
| Issues | |

4.2.4 DEVICE MANAGEMENT STATE DIAGRAM

JumpPad has the notion of the “Managed” and “Unmanaged” state. It is an attribute of the managed device. This is an administrative state that user decide whether he would like to manage the device or not. If the devices are in unmanaged state, even if the user hits “Deploy”, NMS will not send down the configuration changes to the device. If the device is in “Managed State”, JumpPad will compute all the change set that the user has made so far, and apply that to the device. JumpPad application will have another separate flag called “Sync” state in each device in order to manage whether to connecting to the device when first deployed or not. If the device is in “Sync” state, that mean the device has been synchronized before and when we do the deploy, JumpPad will sync up all the device configuration from the DP first, and then send down the device config change set to the device. If the device in “sync = false” state, that means the device has not been synchronized before, JumpPad will send down the entire configuration that the user has built to the device.

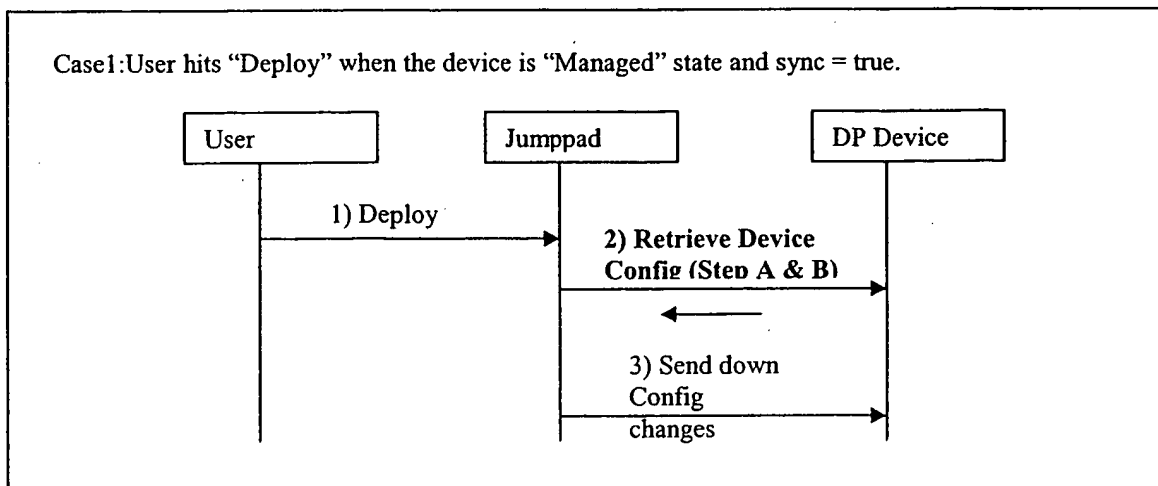
The following is the state diagram of the Device State:



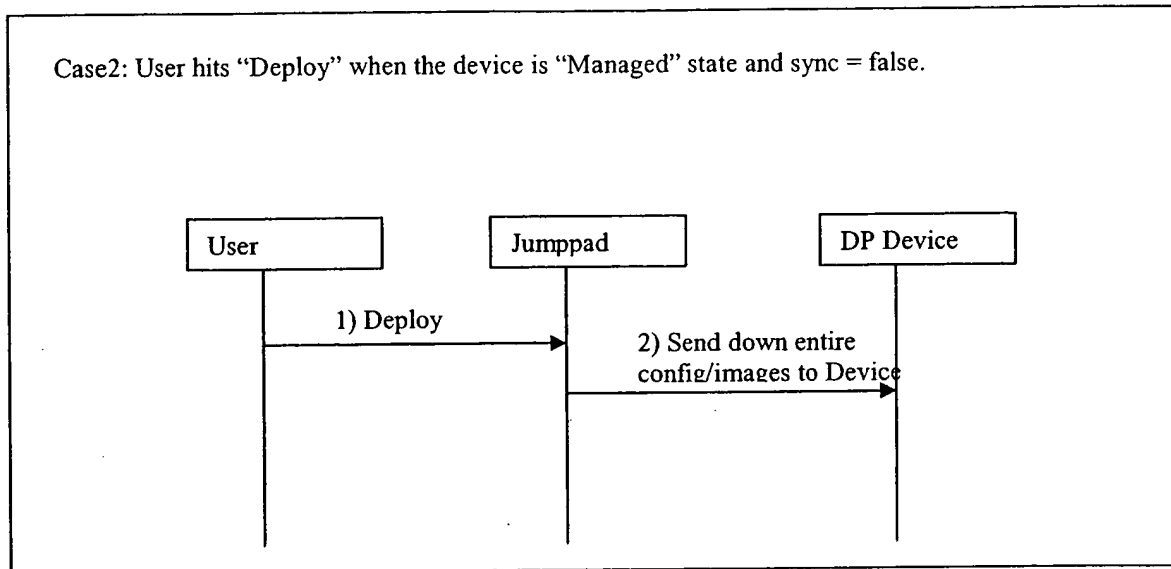
Case 1: A device is in a Managed state (with sync state = true), and the user has chosen to Deploy the network. JumpPad will first retrieve the device config, and then send down the configuration change set to the DP device.

In Step 2), when JumpPad retrieves the device config, if there are no configuration changes (from event log file from DP device), JumpPad will perform no operations.

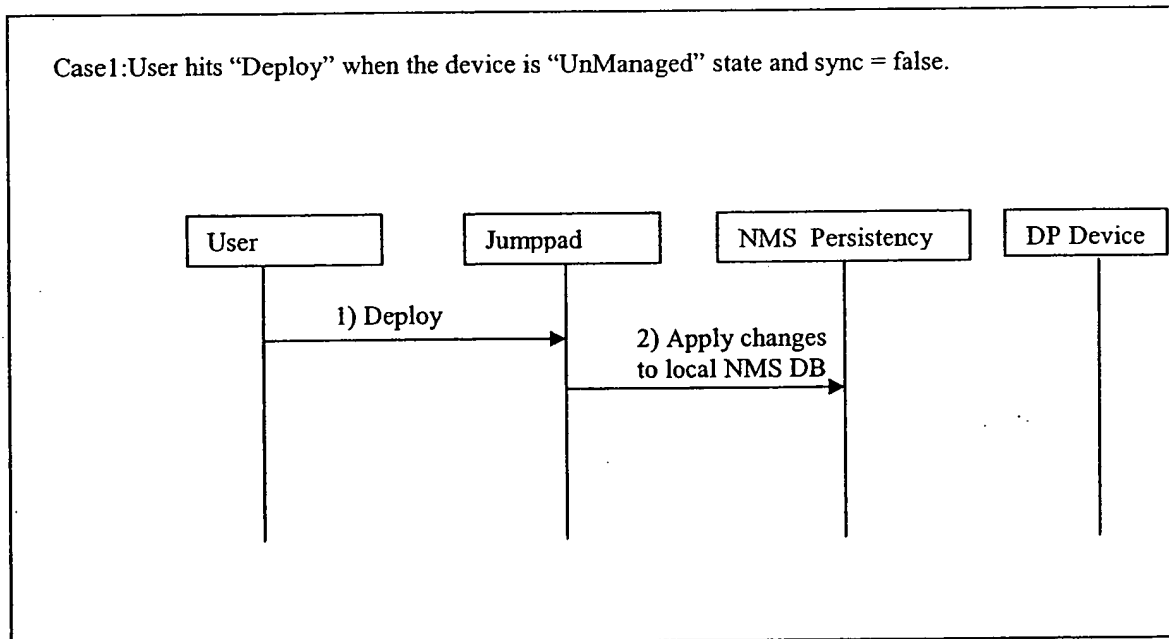
If there are configuration changes, JumpPad will probably retrieve the whole configurations from the device, re-apply them to the current configuration and change set, and re-run the verification step. If there are any errors at this point, JumpPad will prompt the user again.



Case 2: A device is in a Managed state (with sync state = false), and the user has chosen to Deploy the network. JumpPad will send down the entire configuration change and/ or images directly to the DP device

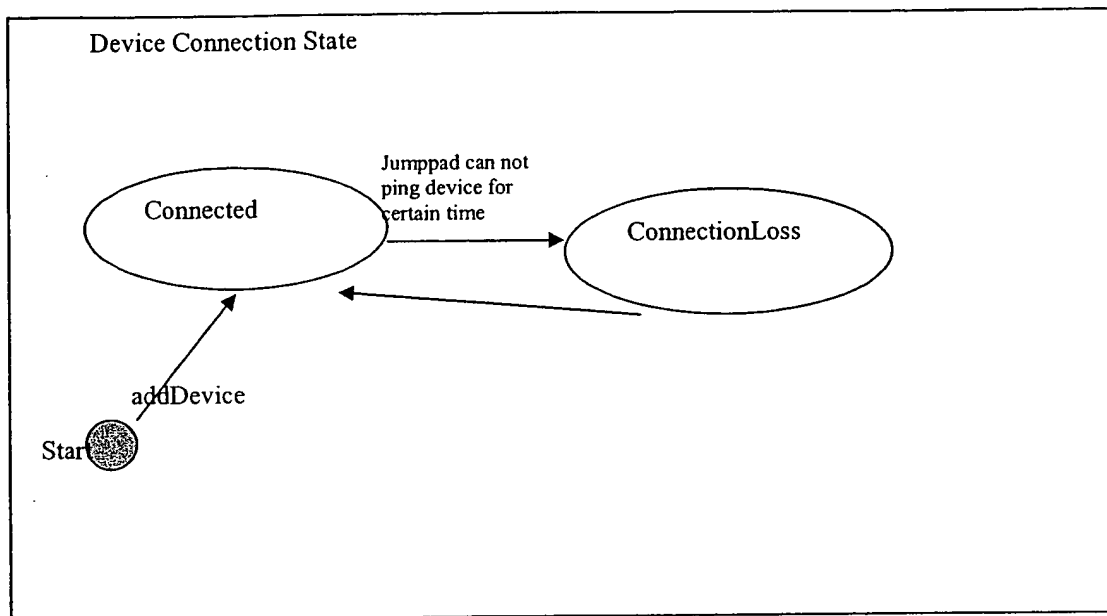


Case 3: A device is in an Unmanaged state (sync state = false), and the user has chosen to Deploy the network. JumpPad will only apply the configuration change locally at NMS level.



4.2.4.1 DEVICE CONNECTION STATE

JumpPad will also keep a copy of the Device Connection State which keeps track of whether JumpPad can connect to the device or not.



JumpPad will have some kind of TCP connection to the device that is up and running all the time. JumpPad will be listener and register for the call back of the "Keep Alive" function. (There is some timeout mechanism to detect the connection loss). JumpPad will get notified if the connection is lost and take certain action such as coloring the Device to "red" to indicate the connection to the device is lost.

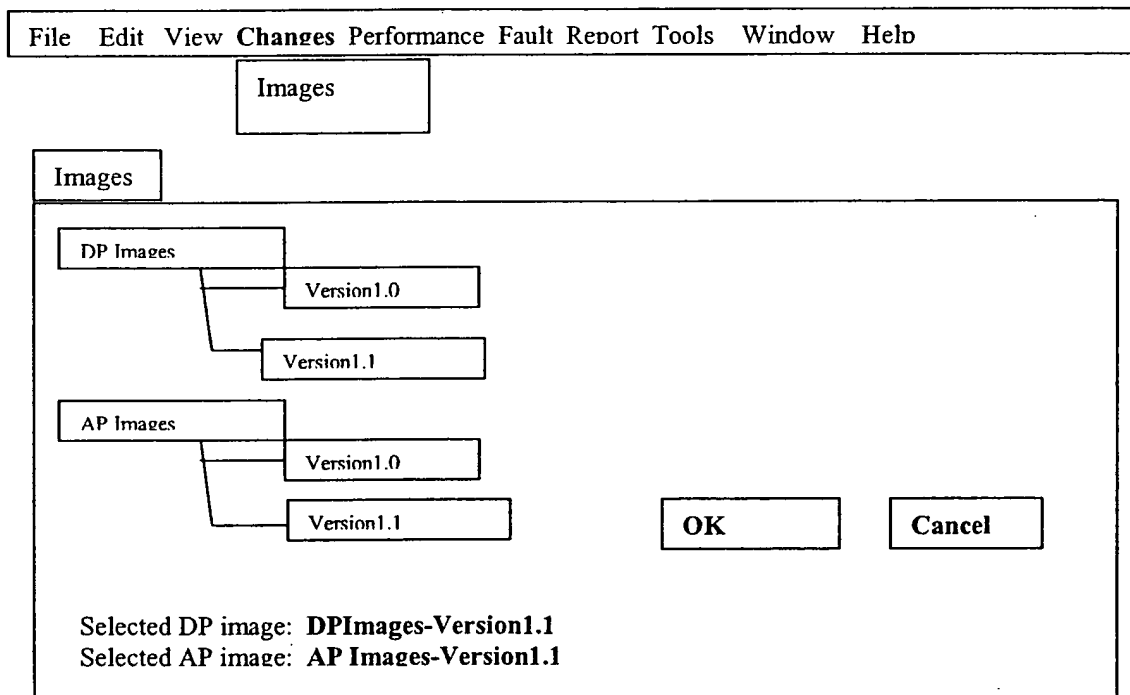
4.2.5 SAVE SNAPSHOT VERSION OF THE CONFIGURATION

Just a note that we need to have a place to invoke to save the "SNAPSHOT" of the network plan and in case the deployment of the configuration totally disabled the device, and needs to use last Saved SNAPSHOT to revert back to the previous state.


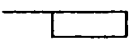
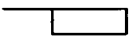
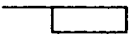
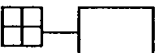
4.3 IMAGE DOWNLOAD AND UPGRADE

NMS product will deploy new images in the normal management path as other changes. To upgrade the images for a set of DP/APs, JumpPad will provide a Bulk-Upgrade tool to easily upgrade all the DPs and APs in the network. The following steps will be performed:


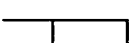
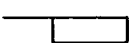
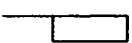
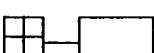
1. User will select a list of images for the AP and DP. There is a default image for AP and DP images for ease of use if the user did not select the images.
2. User will select a list of devices (for upgrade scenario) for the image upgrade to take place. By default, all the devices in the network will be upgraded to the selected images as mentioned in step1.
3. JumpPad will send the image to the DP, and save it on the DP disk if DP does not already have the image.
4. JumpPad will send the configuration file that refers to the DP/AP image name and version to DP.
5. DP will reboot itself after the image/config file download complete if user chooses "Reboot Now" option.



Once the user has clicked on "Ok", JumpPad will be able to go to the devices in the network and query all the existing image versions of the devices, and launch the next UI screen:

| Image Upgrade | | | |
|-----------------|---|-----------------------|---|
| New DP Version: | | DPVer1.1.image1 | New AP Version: APVer1.1.image1 |
| Device List | | | |
| | Devices | Current Image Version | Status |
| X |  DP1 | DPVer1.0Image1 | |
| |  AP1 | APVer1.0Image1 | |
| |  AP2 | APVer1.1Image1 | |
| |  AP3 | APVer1.0Image1 | |
| X |  DP1 | DPVer1.0Image1 | |
| | | | <input type="button" value="Next"/> <input type="button" value="Cancel"/> |

User can select the "Next" option if he chooses to and JumpPad will launch the next Reboot screen to let the user choose whether the devices will be rebooted after the image download is complete.

| Reboot Option | | | |
|-----------------|---|-----------------------|--|
| New DP Version: | | DPVer1.1.image1 | New AP Version: APVer1.1.image1 |
| Device List | | | |
| | Devices | Current Image Version | Reboot Now Option |
| X |  DP1 | DPVer1.0Image1 | <input type="button" value="Yes"/> |
| |  AP1 | APVer1.0Image1 | <input type="button" value="Yes"/> |
| |  AP2 | APVer1.1Image1 | |
| |  AP3 | APVer1.0Image1 | |
| X |  DP1 | DPVer1.0Image1 | |
| | | | <input type="button" value="Upgrade"/> <input type="button" value="Cancel"/> |

| | |
|------------------------|--|
| Pre-conditions | User has built a network plan that consists of one or more devices. The devices have been physically installed. |
| Post-conditions | The device images are downloaded and upgraded. |
| Main-Flow | <ol style="list-style-type: none"> 1. User chooses Config-> "images" to select the images view and start selecting which images to upgrade to DP and APs. By default, JumpPad will associate with a default config file and image for the APs. Note that only one set of DP image and AP image can be selected at a time. 2. User clicks on "Ok" once he has selected the image version to upgrade to. 3. JumpPad displays a dialog box to show a list of devices in the network and their current versions of the software images that the DPs and APs are currently running. 4. User selects a list of devices (including DPs and APs) that he would like to upgrade, and clicks on "Upgrade". JumpPad will support "Reboot Now" option to allow device to reboot immediately if the user chooses to. 5. For each DP in the network, JumpPad will perform the following: <ol style="list-style-type: none"> a. JumpPad retrieves the version of each DP first and compares the version with what the user specifies. b. If the versions are different, JumpPad will first download the DP/AP images to the device if they are not yet on the device. c. JumpPad sends the Config XML file that references the image files to the DP. d. If the user has chosen "Reboot Now" option, device will reboot itself with the specified new image file and replace the software images for all the selected APs (followed by reboot also). 6. JumpPad will support a progress bar dialog to show all the DPs that have been upgraded. User can click on status on each DP to review the status. |
| Exceptions | |
| Alternate Flows | For first deployment, user only need to select the images before hits "Deploy" and NMs will assume to download all the DPs and APs with the selected version. |
| Issues | |

4.3.1 REBOOT DEVICE WITH NEW IMAGE

If user has chosen the images to download to the device and AP, but not chosen "Reboot Immediately" option, JumpPad allows the user to later on to reboot the APs or devices.

| | | | | | | | | |
|------|------|------|---------|-------------|--------------|-------|--------|------|
| File | Edit | View | Changes | Performance | Fault Report | Tools | Window | Help |
|------|------|------|---------|-------------|--------------|-------|--------|------|






Images -> Download
Reboot

If user has chosen the Reboot option under Images, the following dialog will be launched to allow the user to select which AP or DP to reboot

Reboot Option

New DP Version:

New AP Version:

| Device List | | | |
|-------------|---|-----------------------|------------------------------------|
| | Devices | Current Image Version | Reboot Now Option |
| X |  DP1 | DPVer1.0Image1 | <input type="button" value="Yes"/> |
| |  AP1 | APVer1.0Image1 | <input type="button" value="Yes"/> |
| |  AP2 | APVer1.1Image1 | |
| |  AP3 | APVer1.0Image1 | |
| X |  DP1 | DPVer1.0Image1 | |

5 VERIFY

Verification (or validation) occurs at different phases. This section covers a more on-demand verification. There is also implicit or syntactic verification when data is being entered or configured. This is not the focus of this section.

[ALLAN: Long term we need to define the verification that will take place for the configuration. For now we should insert a placeholder for each area we will verify in the offline config view:

Device Verification

VLAN Verification

RF Verification

....etc

As we define the rules we can update the spec to includes those rules]

5.1 NETWORK

[ALLAN: Any verification of the network against planned only makes sense if there are no outstanding changes existing in the current view. So if the user invokes either of these functions while changes exist, the application will prompt them to revert changes or discard changes or cancel operation]

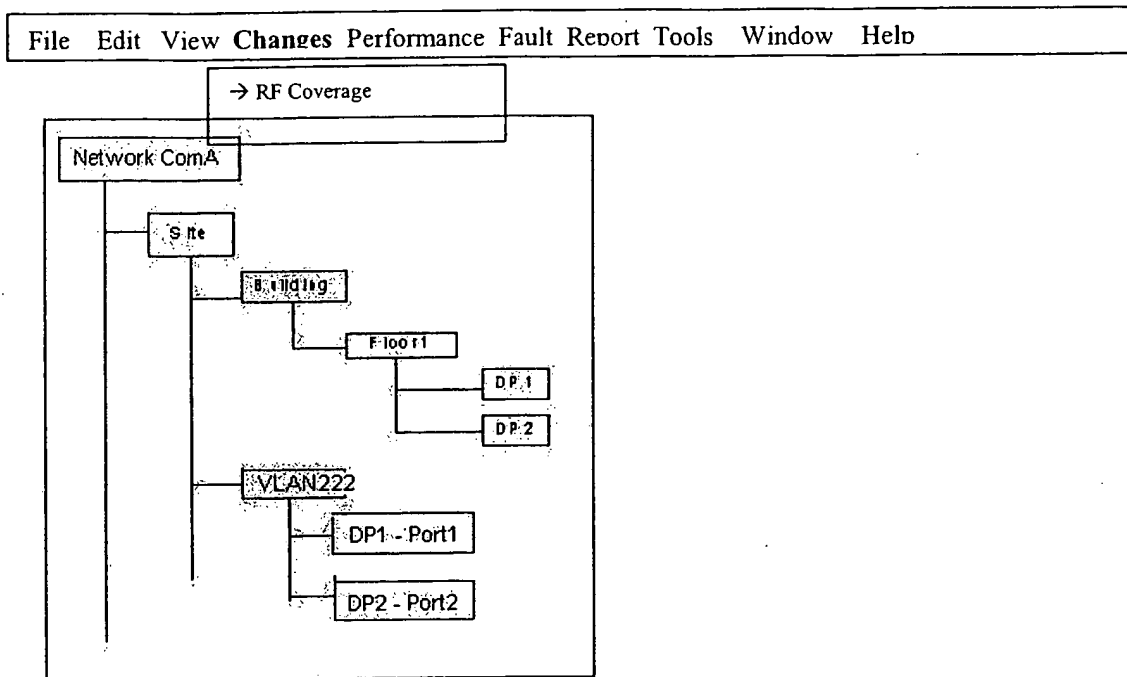
5.1.1 VERIFYING RF COVERAGE

| | |
|---------------------------|---|
| Pre-conditions | A network plan is open. |
| Post-conditions | RF Coverage is performed on opened network plan. |
| Main-Flow | <ol style="list-style-type: none"> 1. User chooses from "Changes" Menu to select "RF Coverage" menu item. 2. If the Device is in a Managed and "Sync" states, JumpPad will retrieve actual RF coverage from each device. 3. User can modify the network plan to contain an optimal RF Coverage. 4. User can opt to view the existing RF Coverage on a detailed map. |
| Exceptions | |
| Alternate Flows | <p>If the Device is in an Unmanaged state, JumpPad will run a set of verification rules associated with the configuration, and provide an approximation.</p> <p>Repeat Step #3 from the Main-Flow section.</p> |
| Issues & Notes | Once any modification of the network plan is modified, JumpPad will save its configuration data. |

Verifying RF Coverage can be handled from within the “Changes” Menu. A new menu item called “RF Coverage” can be added. In term of RF Coverage, it will be measured in term of the entire Network Plan versus Actual Plan.

RF Coverage attributes (there may be more...)

- Signal Strength
- Hotspots
- Overlaps
- Dead spots



RF Coverage to be viewed on a Site, Building, Floor, VLAN, or DP device basis:

RF Coverage

RF Coverage Area: **Site1**

DP Selection: **Site1.Building2.Floor2.DP1**

Current Coverage Area:
65%
5.5 Mbps

RF Property based on DP
Signal Strength: 78%
Hotspots: 3
Overlaps: 1
Deadspots: 3
Power Setting: 200 mW

Proposed Coverage:
100%
10 Mbps

Select "Edit Parameter..." to modify device for optimal usage.

Edit Parameter... **Close**

Site1
Site2
Building1
Building2
Floor1
Floor2
DP1
DP2
VLAN100
VLAN200

Any of the RED highlights depict that user should make changes to optimize usage.

5.1.2 VALIDATING PLANNED VS. ACTUAL DEPLOYMENT

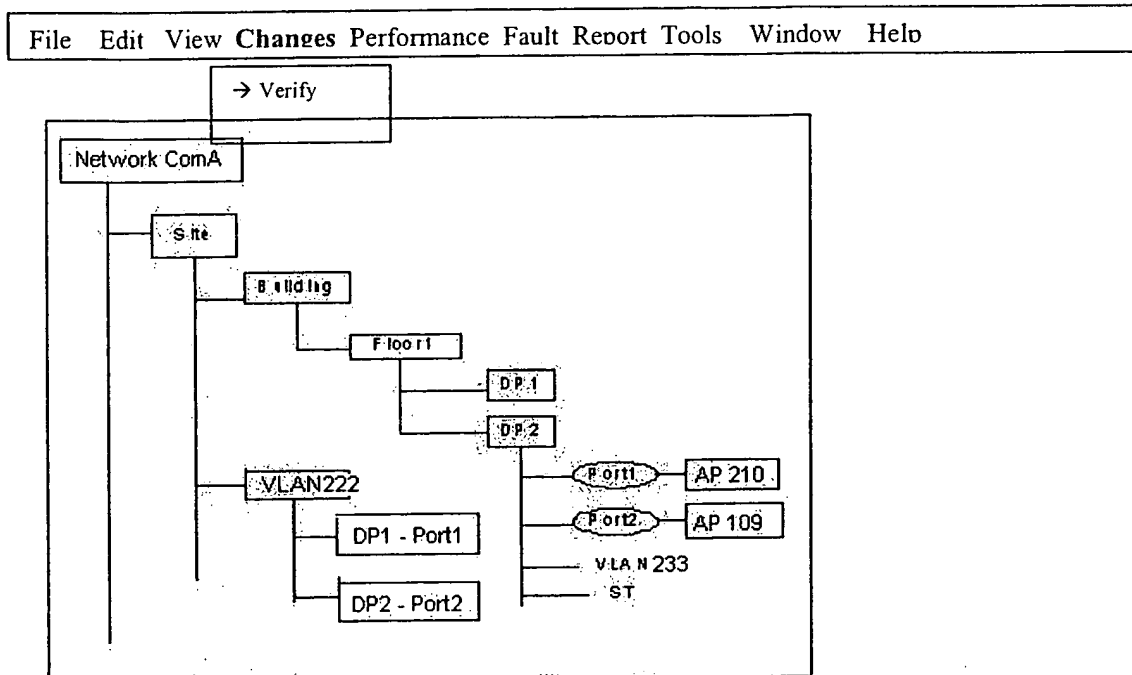
[ALLAN: Need example window and what we will actually check]

5.2 VERIFICATION OF NETWORK CONFIGURATION DATA

5.2.1 VERIFYING CONFIGURATION CHANGES

| | |
|---------------------------|--|
| Pre-conditions | A network plan is open and changes exist in the current view. |
| Post-conditions | The configuration changes made by the user will be verified for correctness before deployment |
| Main-Flow | <ol style="list-style-type: none">1. User chooses from "Changes" Menu to select "Verify" menu item.2. JumpPad will run a set of verification rules associated with the configuration, and report a list of error conditions, or miss-configuration information.3. User can go back to the configuration, and correct the configuration, and repeat the step above. |
| Exceptions | |
| Alternate Flows | |
| Issues & Notes | Note that JumpPad will only save the configuration data, not the performance/statistics, fault/event data. |

From either Logical or Topological View, user can perform verification against any device or the entire plan.



Case #1: If there is NO Change set on the entire Network Plan.

WARNING:

JumpPad detects that no ChangeSet has been changed.

Do you want to run verification against the entire Network Plan?

Yes

No

All the devices will be verified again. User can cancel the verification process at anytime.

Verification to be performed: Network ComA

| | Status |
|--|----------------|
| Running Device Verification against: DP1 | Success |
| Running Device Verification against: DP2 | Failed |
| Running VLAN Verification against: VLAN222 | Failed |
| Running VLAN Verification against: VLAN233 | Success |
| | |

Verify **Cancel** **Details >>>**

Verification Summary

DP1: ok
DP2: failed; mis-configuration of data
VLAN222: failed; VLAN no longer exists
VLAN233: ok

<< Back **Ignore** **Edit** **Finish**

Case #2: If there are some Change set on the Network Plan.

Verification to be performed: Network ComA

| | Status |
|--|---------|
| Running Device Verification against: DP1 | Success |
| Running VLAN Verification against: VLAN222 | Failed |
| | |

Verify **Cancel** **Details >>>**

Only the Devices with Change Set are verified; others will be skipped. User can cancel the verification process at anytime.

Verification Summary

DP1: ok

VLAN222: failed; VLAN no longer exists

<< Back **Ignore** **Edit** **Finish**

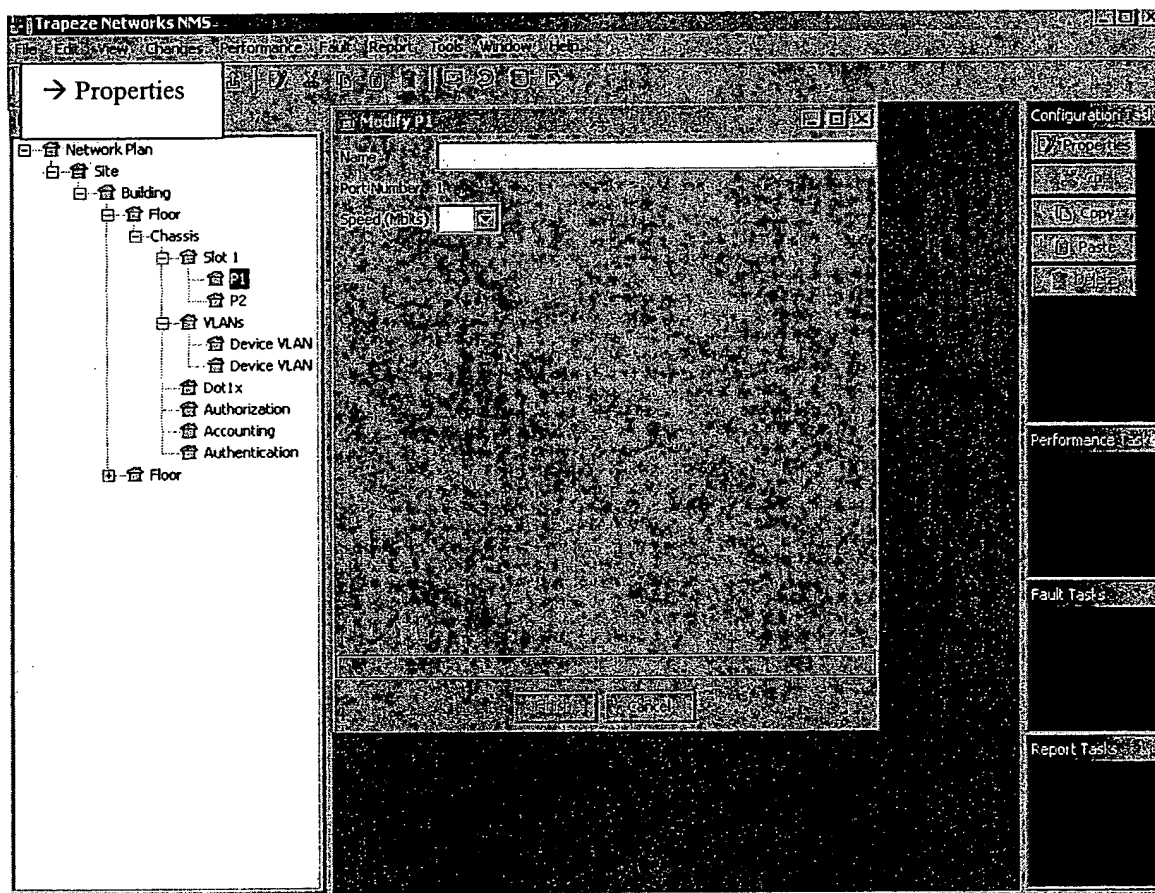
Once verification is performed, JumpPad will save the configuration data as well as any modification when the "Finish" button is pressed.

6 OPERATE

During the normal operation of a network a manager will makes changes to the network configuration and images do performance analysis and check for faults. The following sections outline some of the operational tasks the application will provide.

6.1 NETWORK CONFIGURATION SUPPORT

This section will detail all of the configuration elements we will support and how. User can view, or modify the configuration of the device, VLAN, or plan at any time. By selecting a device or entity in the organizer tree, one can select from "Edit"→ "Properties" to launch any menu to view the configurations of the device, port, or any VLAN or Spanning tree entity.



6.1.1 BASIC DEVICE CONFIGURATION SUPPORT

This section will describe the various other basic device config features we will support. Examples:

- SNMP Trap/Community Strings
- Telnet passwords/account/basic account management
- RADIUS/TACACS client

- NTP
- DNS
- Port Configuration

File Edit View Changes Performance Fault Report Tools Window Help

Properties

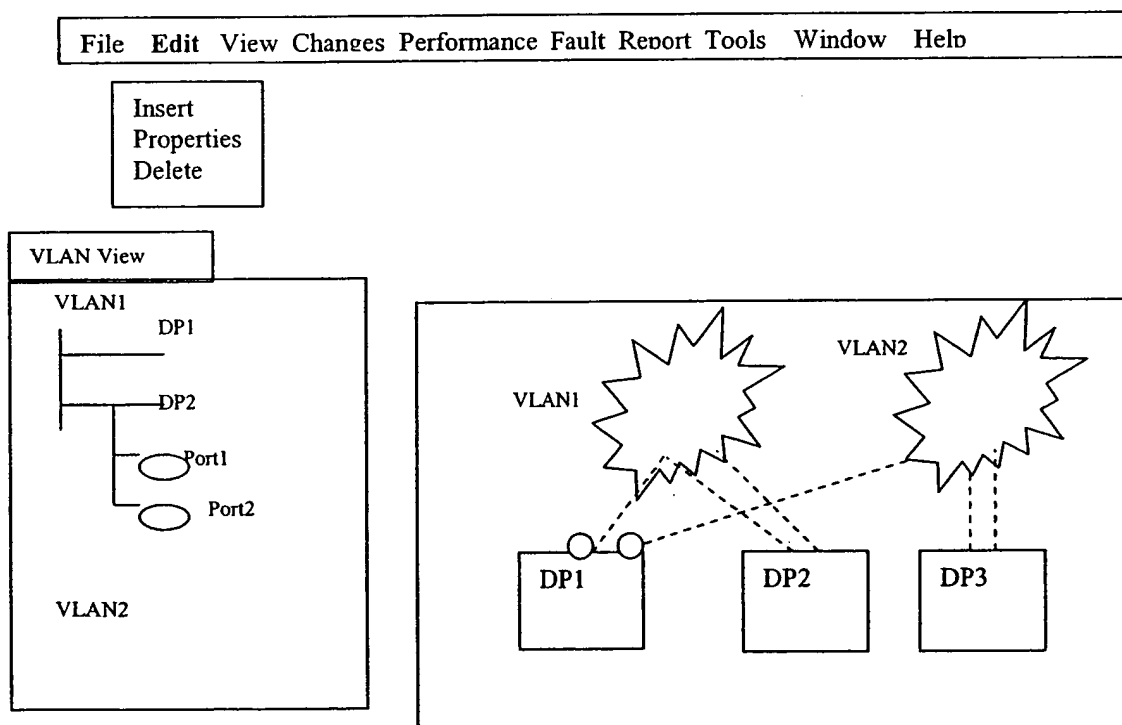
When user clicks on a particular device or port, the user can select “Property” to launch the following dialog to view the configuration of the device or making changes:

| | |
|-----------------------|----------------------|
| DPChassis: 128.10.1.2 | |
| Name: | <input type="text"/> |
| IPAddr: | <input type="text"/> |
| NetMask: | <input type="text"/> |
| NTP: | <input type="text"/> |
| SNMP Configuration | |
| Community Name: | <input type="text"/> |
| Trap Destination: | <input type="text"/> |

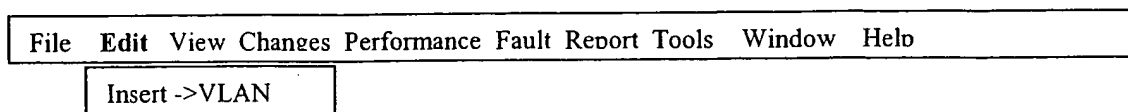
6.1.2 VLAN SUPPORT

This section will describe what VLAN capabilities we need to configure. The purpose of the VLAN view is to provide an overall network view of the VLAN, and where the DP resides in relative to the VLAN etc. The following functions are defined:

- Create a VLAN
 - Port Members
 - QoS Parameters
 - ACLs
- Modify a VLAN
- Delete a VLAN
- Show a list of VLANs in the map VLAN->DP->Port



6.1.2.1 CREATE A VLAN



User can go to “Edit”->”Insert->”VLAN” to add a VLAN in the network.

The following parameters that need to be configured when user creates a VLAN:

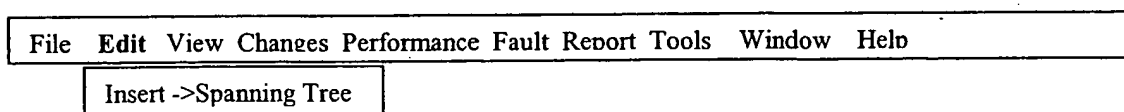
- VLAN Number (default 1, range: 1-1005)
- VLAN name (“default”)
- VLAN state (active or suspended) (default: active)
- MTU (Maximum transmission unit) (Default 1500, range: 1500-18190)
- SAID (Security Association ID) (Default: 100001)
- Port Group Members

6.1.3 SPANNING TREE SUPPORT

Spanning Tree algorithms provide path redundancy by defining a tree that spans all of the switches in an extended network and prevent the loop hole in the network. JumpPad provides the following capabilities:

- Create a Spanning tree
- Modify a Spanning tree
- Delete a Spanning Tree
- View a Spanning Tree

6.1.3.1 CREATE A SPANNING TREE



User can go to “Edit”->”Insert->”Spanning Tree” to add a Spanning Tree in the network.

The following is a list of parameters that need to be configured for a spanning tree:

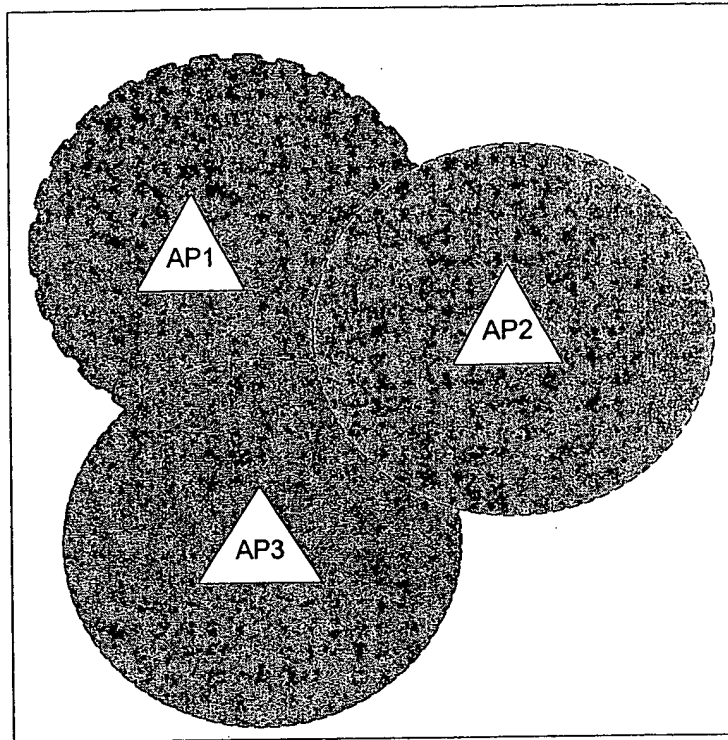
- Spanning Tree ID
- Spanning Tree Type (802.1d or pvst) (default is 802.1d)
- State (enabled or disabled) (default is disabled)

- Forward delay time (default 15 seconds)
- Hello time (default 2 seconds)
- Maximum Aging time
- ?? Bridge priority
- ?? Bridge ID priority
- ?? Port Priority
- ?? Port cost
- ?? Port VLAN priority
- ?? Port VLAN cost

6.1.4 RF SUPPORT

The following features are desired: (See Section 5 for RF Coverage Verification)

- Show the RF topology
 - How do we do Channel Assignments?
 - RF Coverage and bandwidth
 - Detect Interference and rouge APs
- Hotspots
- Overlaps
- Dead spots
- Overlay the RF topology with the physical topology map.
- Allow the user to switch off the AP? Can we support this? I.e. don't disable the port in the DP but switch off the RF capability in the AP. Do we need to do this?
- Configure RF related capabilities for the set of APs
 - As a whole
 - Per Ape
 - Maybe have a set of default AP parameters that if you don't override for an AP it uses the default parameters. That way we can configure "as a whole" by setting the default parameters.



In the above RF Topology map, each color represents different channels and their coverage.

6.1.5 QUALITY OF SERVICE SUPPORT

This section will describe what QOS capabilities we need to configure. How do we provide adequate coverage and roaming across all needed areas, traffic engineering?

6.1.6 ACCESS CONTROL LIST SUPPORT

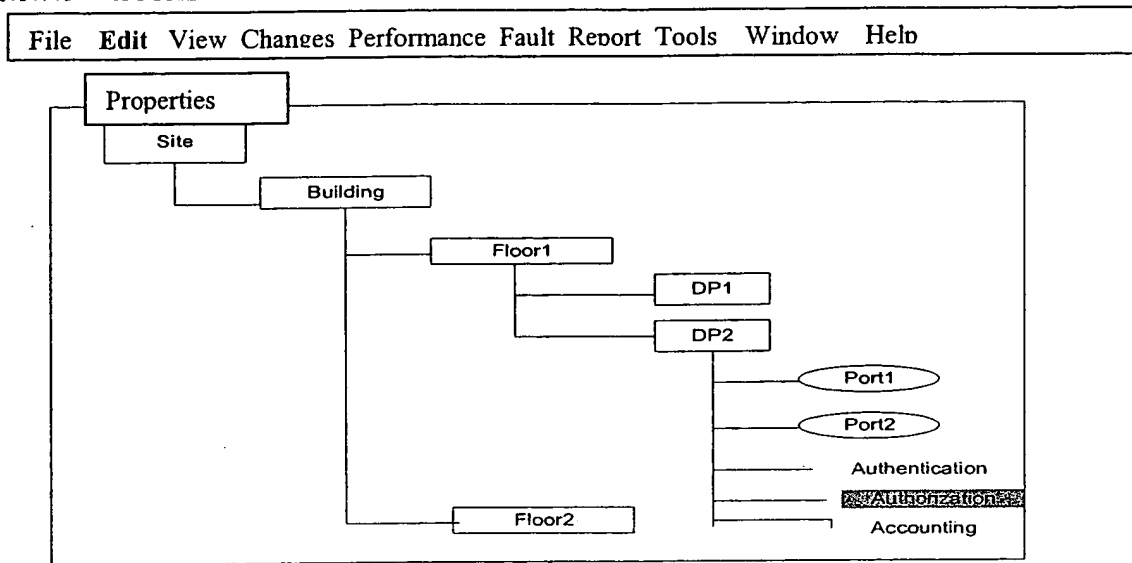
This section describes how NMS handles the ACL (Access Control List) Support and provide necessary configuration support. User should be able to perform the following:

- Enable/disable (global)
- Add an ACL (with ACL index number)
- Remove an ACL (given ACL index number)
- ACL Clauses??
 - Adding a clause
 - Deleting a clause
- Logging ACL activity

6.1.7 AAA SUPPORT

JumpPad will provide necessary AAA (Authentication, Authorization, and Accounting) configurations for security services.

6.1.7.1 AUTHENTICATION CONFIGURATION SUPPORT



For each DP device, user may choose to configure the Authentication security services. The following parameters that need to be configured for Authentication:

- Authentication method (Local, Tacacs, or Radius)
 - Radius Server key, IP Address, port, timeout, retransmit, dead time
 - Or Tacacs Server Key, IP Address, timeout, attempts, directed_requests
- State (enable, or disable)

6.1.7.2 AUTHORIZATION CONFIGURATION SUPPORT

For each DP device, user may choose to configure the Authorization security services. The following parameters that need to be configured for Authentication:

State (enabled, disabled)

6.1.7.3 ACCOUNTING CONFIGURATION SUPPORT

For each DP device, user may choose to view or configure the Accounting services. The following parameters that need to be configured for Accounting:

State (enabled, disabled)

6.2 MANAGED/UNMANAGED OPERATIONAL MODES

For each DP device in a network, JumpPad has the notion of Managed and Unmanaged operation.

1. If the user selects a device and choose to perform “Unmanaged” operation, the JumpPad will stop talking to the selected device, and save the existing configuration to the persistent store. During the “unmanaged” mode, JumpPad will not apply any configuration changes to the device, and only save or retrieve configuration changes to the persistent store (file system in release 1.0).
2. If the user chooses to apply “Managed” operation on an “unmanaged” device, JumpPad will first sync up the configuration data from the device first, and then apply the configuration changes to the device.
3. An “undeployed” device is automatically in an “Unmanaged” mode.

6.2.1 UNMANAGING A DEVICE

| | |
|---------------------------|---|
| Pre-conditions | An active network plan is open and the device are in managed state |
| Post-conditions | The device is in Unmanaged state |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects a device from either the organizational panel or context panel. 2. User chooses from “Changes” Menu to select “Unmanaged” menu item, and clicks on ok. 3. An dialog will pop up and says “The device will be going offline if you click ok” 4. If user clicks on ok, JumpPad will save the existing configuration (only config, but not fault/performance data) to the persistent store 5. JumpPad will change the state of the device to “Unmanaged” and will no longer talk to the device. (For example, kills the background thread for talking to the device). 6. A different device icon will be associating with the unmanaged device. |
| Exceptions | If the device is already in an Unmanaged state, no operation will occur. |
| Alternate Flows | |
| Issues & Notes | Note that JumpPad will only save the configuration data, not the performance/statistics, fault/event data. |

6.2.2 MANAGING A DEVICE

| | |
|---------------------------|---|
| Pre-conditions | An active network plan is open and the device are in unmanaged state |
| Post-conditions | The device is in managed state |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects a device from either the organizational panel or context panel. 2. User chooses from "Changes" Menu to select "Manage" menu item (or by changing the attribute of the device to "Manage") 3. If user clicks on ok, JumpPad will change the state of the device to "Managed". Note that "Manage" state does not mean it will goes to the device immediately. When a user hits "Deploy", then JumpPad will talk to the device. 4. A different device icon will be associating with the unmanaged device. |
| Exceptions | If the device is already in a managed state, no operation will occur. |
| Alternate Flows | |
| Issues & Notes | Do we need to differentiate the device with "Undepolyed", or "Unmanaged" state? If a device is not yet deployed, can we still apply "Manage" on the device? |

How does JumpPad system version the configuration changes? In Release 1.0, JumpPad is using file-based system to store the configuration information. There are two options:

- JumpPad will version each configuration changes after the user has applied the changes to the device only
- Or JumpPad will periodically check-point the configuration, and save that on the persistent store and version that via some timestamp.

6.3 JUMPPAD BACKWARD COMPATIBILITY SUPPORT

JumpPad will provide minimum backward compatibility support for previous versioned DP and AP devices. For example, a JumpPad 2.0 system can provide the minimum monitoring and manageability of DP 1.0 version. If there is any information that JumpPad 2.0 does not understand for DP 1.0, JumpPad will not be able to display or support the functionality.

6.3.1 JUMPPAD SUPPORT OF PREVIOUS DP RELEASE

| | |
|---------------------------|--|
| Pre-conditions | Installed latest JumpPad release and some of the DP in the network are still old release |
| Post-conditions | JumpPad x.x release manages DP y.y release ($x.x > y.y$) |
| Main-Flow | <ol style="list-style-type: none">1. User start up new JumpPad system2. JumpPad discovers that some of the DP are old release3. JumpPad will only read the data that it understood currently and discard the data it does not understand.4. JumpPad may only able to manage part of the functionality of the old DP device. |
| Exceptions | |
| Alternate Flows | |
| Issues & Notes | |

6.4 JUMPPAD PERSISTENCY

The JumpPad will store the network plans, and all associated data persistently. This includes:

- JumpPad-level topology & device data
- Software Images
- Maps, graphics, etc.
- Device configuration data

It is desirable to not require a database. The open issue is how to support simple schemes for sharing, locking, synchronizations and transactions without a DB.

The persistency is also a means of providing some JumpPad level resiliency. The goal is to leverage the network for as much data as possible, and hence minimize the data that needs to be replicated at the JumpPad level.

The JumpPad installation will create a disk structure as described in the [#Installation](#) section. All plans are stored under the “db” sub-directory. Plans are not associated with users, and are accessible by any authorized user.

The User knows a plan by a given name. Internally, the network plan actually may contain a number of different sub-elements, which could be various types of files, configuration data, and references to software images. All plans share a common software image tree, and hence elements in the plan simply refer to the appropriate software image name. Note that this implies that if a plan is somehow shared between two JumpPad installations, both must have the same software images.

6.4.1 CREATING & OPENING NETWORK PLANS

As described in [#Starting JumpPad](#), when the user can create a new network plan on startup. The user can also access this function via the menu bar.

- Menu Option: File -> New Network Plan... (Accelerator: Ctrl+N, Mnemonic: N)
- Menu Option: File -> Open Network Plan... (Accelerator: Ctrl+O, Mnemonic: O)
- Menu Option: File -> Close Network Plan... (Accelerator: Ctrl+L, Mnemonic: L)

The behavior of opening an existing plan is described in [#Working On A Saved Network Plan](#).

6.4.2 SAVING NETWORK PLANS

| | |
|------------------------|---|
| Pre-conditions | A plan is opened or has been newly created. |
| Post-conditions | The plan is saved to a persistent store. |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects a menu option to save the plan. 2. JumpPad saves all of the current data associated with the plan, including any |

| | |
|---------------------------|---|
| | configuration change sets, to the persistent store. |
| Exceptions | 1a. There are no changes associated with the plan: <ol style="list-style-type: none"> JumpPad will disable the "Save" menu option. The user is not able to save the plan. |
| Alternate Flows | 1a. The user invokes the "Save As" menu option: <ol style="list-style-type: none"> JumpPad will prompt the user to enter a name for the plan. JumpPad will attempt to save the plan under the new name. If a plan with the same name already exists, the User will be warned of this condition, and asked if the intent is to replace the existing plan. JumpPad will close the current plan, and open the newly created plan for the user. |
| Issues & Notes | |

The user can access functions to save plans via the menu bar:

- Menu Option: File -> Save Network Plan... (Accelerator: Ctrl+S, Mnemonic: S)
- Menu Option: File -> Save As Network Plan...(Accelerator: <none>, Mnemonic: <none>)

6.4.3 DELETING NETWORK PLANS

| | |
|---------------------------|---|
| Pre-conditions | A plan has been created and saved. |
| Post-conditions | A plan is deleted from the persistent store. |
| Main-Flow | <ol style="list-style-type: none"> User selects a menu function to delete a plan. JumpPad lists the existing plans. User selects a plan from the list, and hits a delete button. JumpPad removes the plan and all of its associated data from persistent store. |
| Exceptions | 3a. Plan is in use (either by current user or another user?) <ol style="list-style-type: none"> JumpPad detects that the plan is in use. The delete operation is not allowed. |
| Alternate Flows | • There is an implication that we will have a mechanism to detect that a plan is in use. This implies some sort of locking scheme. Where is this? |
| Issues & Notes | |

The delete function is accessed via the menu bar:

- Menu Option: Edit -> Delete (Accelerator: Ctrl+D, Mnemonic: d)

6.4.4 SHARING NETWORK PLANS

JumpPad does not provide any facility to share plans between machines.

We have discussed the possibility of allowing the user to store the plan on a shared disk. This implies that during install, or as a preference, we should allow the user to point to a different “db” directory.

We may want to consider providing a way to tar/zip a plan, so that it can be manually transferred to a different machine.

6.4.5 AUTOSAVE OF NETWORK PLANS

JumpPad will provide a user preference to enable/disable an Auto save feature. If the feature is enabled the user can specify a time interval. JumpPad will automatically save the plan after the specified interval. This information (that the save is in progress) will be displayed to the user.

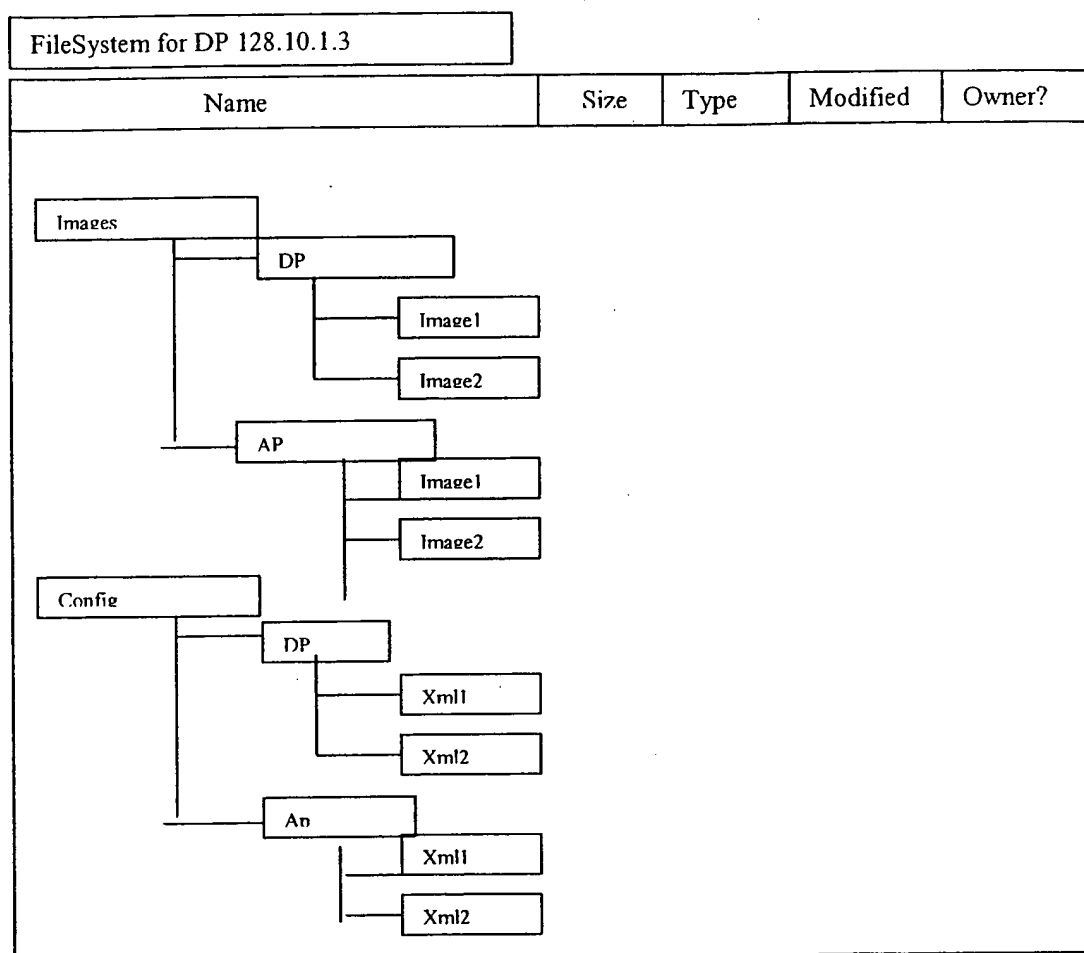
6.5 DEVICE (DP) FILE SYSTEM SUPPORT

The DP will have a file system that supports saving various configuration and image files for both the DP and AP(s).

The management product will support:

- Download of configuration files and image files. The management product will use TFTP to transfer files to the device. This requires the management product to have a TFTP server running and it will instruct the DP to download from the server address a specific file representing the configuration or image file.
- Upload of configuration files. The management product will use TFTP to transfer files from the device. Same method as download.
- File system status. The management product will be able to show the contents of the file system, file sizes, owner (?), and amount of free disk space.
- File system operations. The management product will be able to rename files, delete files, compact the file system (if supported).

All operations will be initiated via the CLI/XML automatically by the management product. The file system status/contents...etc will be read via the XML interface.



User will be able to view the contents of the DP file system, and perform necessary operations on the file system such as renaming a file or delete a file. User can use the standard **Edit->** menu to perform the following operations.

- **Edit Menu**
 - **Insert Menu Item**
 - Insert Menu Item provides the user the ability to add a file
 - **Cut Menu Item**
 - This menu item allows the user to delete a file.
 - **Copy Menu Item**
 - This menu item provides the user the capability to copy a file.
 - **Paste Menu Item**

- This menu item provides the user to paste the copied file to a different location.

- o **Rename Menu Item**

- This menu item provides the user to rename the file to a different name.

6.5.1 MANAGING DP FILE SYSTEM (ADD, DELETE FILES & DIRECTORIES)

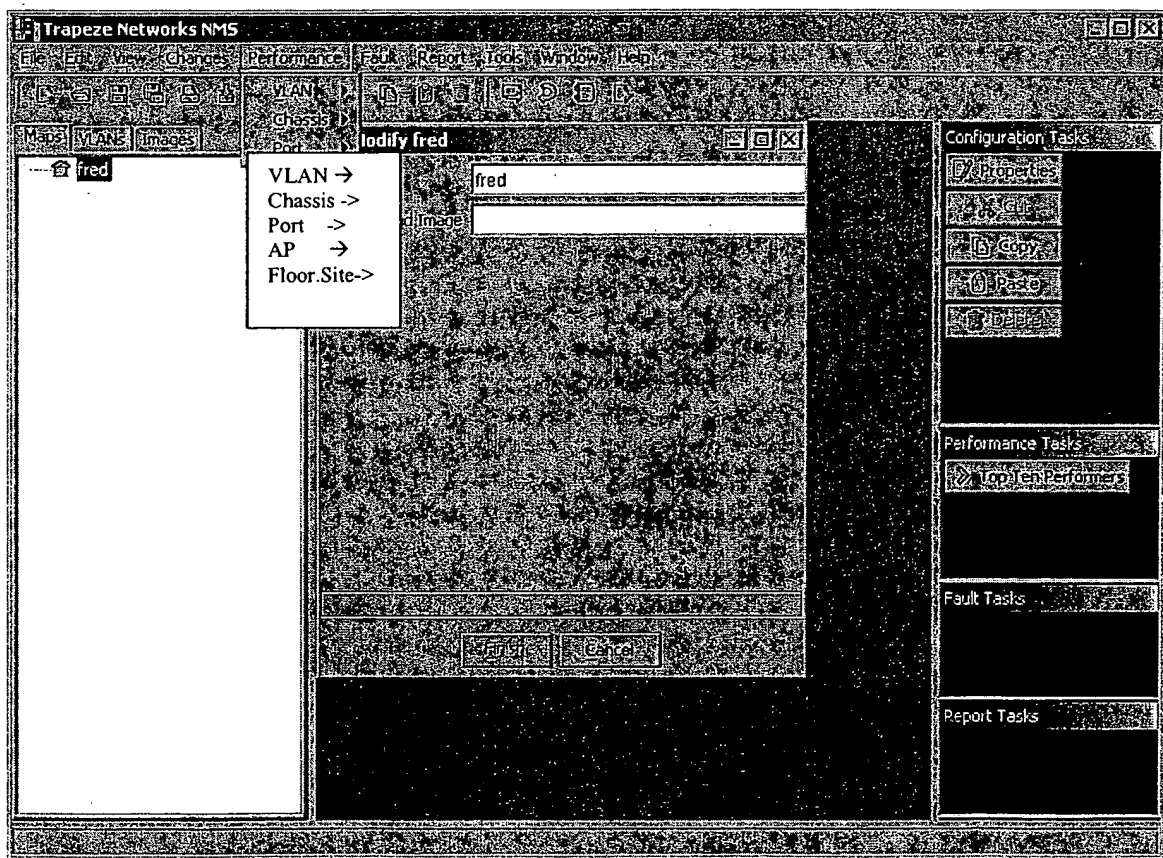
| | |
|---------------------------|---|
| Pre-conditions | JumpPad is connected to the selected DP device |
| Post-conditions | JumpPad displays the File System for a particular DP and performs certain file system operations. |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects a DP device and chooses "File System" menu item under "Config" menu. 2. JumpPad query DP with the XML/CLI interface for all the files and directories under the DP hard disks and displays the status and contents of the files such as file size, file type, and last modified time. 3. User can perform file management operations such as rename the file/directory, delete a file/directory, or compact a file (if supported) using the standard Edit menu. 4. JumpPad will send the request for the above operation via XML/CLI interface to the DP device. 5. Upon receiving successful response from the DP, JumpPad presents the necessary changes to the user. |
| Exceptions | If the device is not connected or Unmanaged, an exception will be thrown "Can not communicate to the DP". |
| Alternate Flows | |
| Issues & Notes | Do we need to have this operation be protected by some kind of privilege? (It is kind of risky to have NMS system to modify the file system on DP). |

6.6 PERFORMANCE MANAGEMENT

This section describes the performance management capabilities within the. The performance parameters will be easily accessible from the configuration views of the network. All performance options are ONLY available on actively managed network elements. That is, a user will not be able to monitor performance on a configuration element that has not yet been deployed.

JumpPad will retrieve all performance/statistics information from the device on demand and provide flexible way of viewing the graphs in different formats such as Graph or chart. JumpPad operations and actions are object-based and context-sensitive. If a user selects an object like VLAN, or port, and he can launch the Performance/Statistics Graphs from the **Performance** menu for a VLAN or port. The user can also launch the performance/statistics task from the right-hand side Performance tasks list.

If the user does not select a particular object such as VLAN or DP, launching the Chassis menu will prompt the user to select a DP first, and then bring up the Performance graph for that object.



- **Performance Menu**

The Performance menu allows the user to retrieve and view the Performance and Statistics of a selected object, such as VLAN, Chassis, or port.

- **VLAN Menu Item**

- VLAN Menu Item provides the General Health, Graph and Chart Statistics, and potential bottlenecks for the VLAN.
- Chassis Menu Item
 - Chassis Menu Item provides the General Health, Graph and Chart Statistics, and potential bottlenecks for a selected Chassis.
- Port Menu Item
 - Port Menu Item provides the General Health, Graph and Chart statistics for a selected port.
- AP Menu Item
 - AP Menu Item provides the General Health, Graph and Chart statistics for a selected AP (including some wireless stats).
- Floor.Site Menu Item
 - VLAN Menu Item provides the General Health, Graph and Chart Statistics, potential bottlenecks for the Container (Floor, Building or Site).

All of the performance option panels will be polled periodically for the data. The poll rate will be configurable per panel but a default will be configurable as part of the application preferences.

6.6.1 VLAN LEVEL PERFORMANCE

Selection: The user selects a VLAN from any organizer view and selects Performance Menu->VLAN for any of the submenu such as Statistics Graphs or Potential Bottlenecks.

| |
|--|
| Performance VLAN -> Statistics Graphs Potential Bottlenecks |
|--|

6.6.1.1 PERFORMANCE->VLAN ->STATISTICS GRAPH

This option provides a context view with the DP's statistics in a table for all ports on the DP. There will be several parameters that the user can select which parameter that the user would like to see the Graphs or views. The user can select whether he wants to view the statistics via table or graph.

- The following statistics will be shown per VLAN
 - What are the statistics on a VLAN level
 - Number Of Clients

- Each column of the table will be sort able so the user can sort based on the top packets/bytes in/out per DP.
- The context view will also have the ability to display all of the data in a time graph rather than being tabulated.
- The user will be able to select a port row in the table and invoke a context graph view for that particular port only.

6.6.1.2 PERFORMANCE->VLAN ->POTENTIAL BOTTLENECKS

This option provides a context view that lists the APs currently connected to the DP that may have potential bottleneck/throughput problems. This list may be empty in which case the panel will show "none".

6.6.2 DP LEVEL PERFORMANCE

Selection: The user selects DP from any organizer view. All of the performance option panels will be polled periodically for the data. The poll rate will be configurable per panel but a default will be configurable as part of the application preferences.

Performance
Chassis -> Statistics Graphs
Potential Bottlenecks

6.6.2.1 PERFORMANCE->CHASSIS ->STATISTICS GRAPHS

This option provides a context view with the DP's statistics in a table for all ports on the DP. There will be several parameters that the user can select which parameter that the user would like to see the Graphs or views. The user can select whether he wants to view the statistics via table or graph.

- The following statistics will be shown per port
 - Packets/Bytes In
 - Packets/Bytes Out
 - Number Of Clients
- Each column of the table will be sort able so the user can sort based on the top packets/bytes in/out per port.

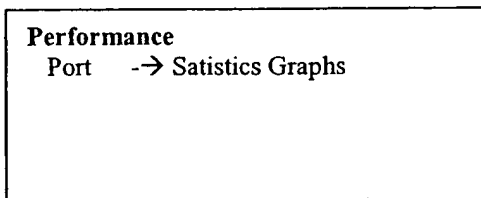
- The context view will also have the ability to display all of the data in a time graph rather than being tabulated.
- The user will be able to select a port row in the table and invoke a context graph view for that particular port only.

6.6.2.2 PERFORMANCE->CHASSIS -> POTENTIAL BOTTLENECKS

This option provides a context view that lists the APs currently connected to the DP that may have potential bottleneck/throughput problems. This list may be empty in which case the panel will show "none".

6.6.3 PORT LEVEL PERFORMANCE

Selection: The user selects a Port from any organizer view. All of the performance option panels will be polled periodically for the data. The poll rate will be configurable per panel but a default will be configurable as part of the application preferences.



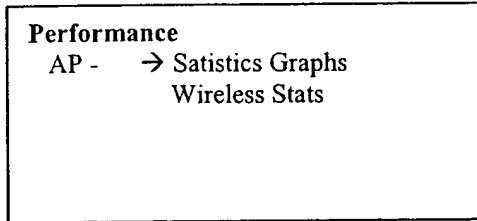
6.6.3.1 FAULT->PORT -> STATISTICS GRAPH

This option provides a context view with the Port's statistics in a table for a port. There will be several parameters that the user can select which parameter that the user would like to see the Graphs or views. The user can select whether he wants to view the statistics via table or graph.

- The following statistics will be shown for a port
 - Packets/Bytes In
 - Packets/Bytes Out
 - Number Of Clients
- Each column of the table will be sort able
- The context view will also have the ability to display all of the data in a time graph rather than being tabulated.

6.6.4 AP LEVEL PERFORMANCE

Selection: The user selects AP from any organizer view and launches the menu under Performance->AP related statistics options.



6.6.4.1 PERFORMANCE->AP ->STATISTICS GRAPHS

This option provides a context view with the AP's statistics in a table for all clients on the AP.

- The following statistics will be shown per AP
 - Packets/Bytes In
 - Packets/Bytes Out
 - Number Of Clients
- Each column of the table will be sort able so the user can sort based on the top packets/bytes in/out per client.
- The context view will also have the ability to display all of the data in a time graph rather than being tabulated.
- The user will be able to select a client row in the table and invoke a context graph view for that particular client only.

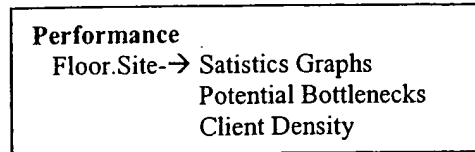
6.6.4.2 PERFORMANCE->AP ->WIRELESS STATS

This option provides a context view with the AP's wireless statistics in a table for all clients on the AP.

- The following statistics will be shown per AP
 - Wireless stats?
- Each column of the table will be sort able so the user can sort based on the top wireless stats per client.
- The context view will also have the ability to display all of the data in a time graph rather than being tabulated.
- The user will be able to select a client row in the table and invoke a context graph view for that particular client only.

6.6.5 FLOOR, BUILDING, SITE LEVEL PERFORMANCE

Selection: The user selects a floor or building or site from any organizer view. All of the performance option panels will be polled periodically for the data. The poll rate will be configurable per panel. For the purposes of this section a container can be a floor, a building or a site. The element selected will ultimately constrain the list of devices shown in the particular performance panel.



6.6.5.1 PERFORMANCE->FLOOR.SITE -> STATISTICS GRAPHS

This option provides a context view with the DP/AP's statistics in a table for all clients on the floor, building, or site.

- The following statistics will be shown per AP
 - Packets/Bytes In
 - Packets/Bytes Out
 - Number Of Clients
- Each column of the table will be sort able so the user can sort based on the top packets/bytes in/out per client.
- The context view will also have the ability to display all of the data in a time graph rather than being tabulated.
- The user will be able to select a client row in the table and invoke a context graph view for that particular client only.

6.6.5.2 PERFORMANCE->FLOOR.SITE -> POTENTIAL BOTTLENECKS

- This option provides a context view that lists the Aps/DPs in the floor, building, or site that may have potential bottleneck/throughput problems. This list may be empty in which case the panel will show "none".

6.6.5.3 PERFORMANCE->FLOOR.SITE -> CLIENT DENSITY

This option shows a map that has varying sizes of graphical objects that represent the number of clients connected to a particular point. So, an AP that has a large percentage of clients (say 50% of the overall number of clients) will be shown 50% larger than the others. As part of the map, the actual total number of clients per AP will be shown beside the object on the map.

○

6.6.6 BASIC RF PERFORMANCE

- Channel Speed (Actual)
- Signal Strength
 - - per client
- Signal 2 noise
 - - per client
- Retransmissions

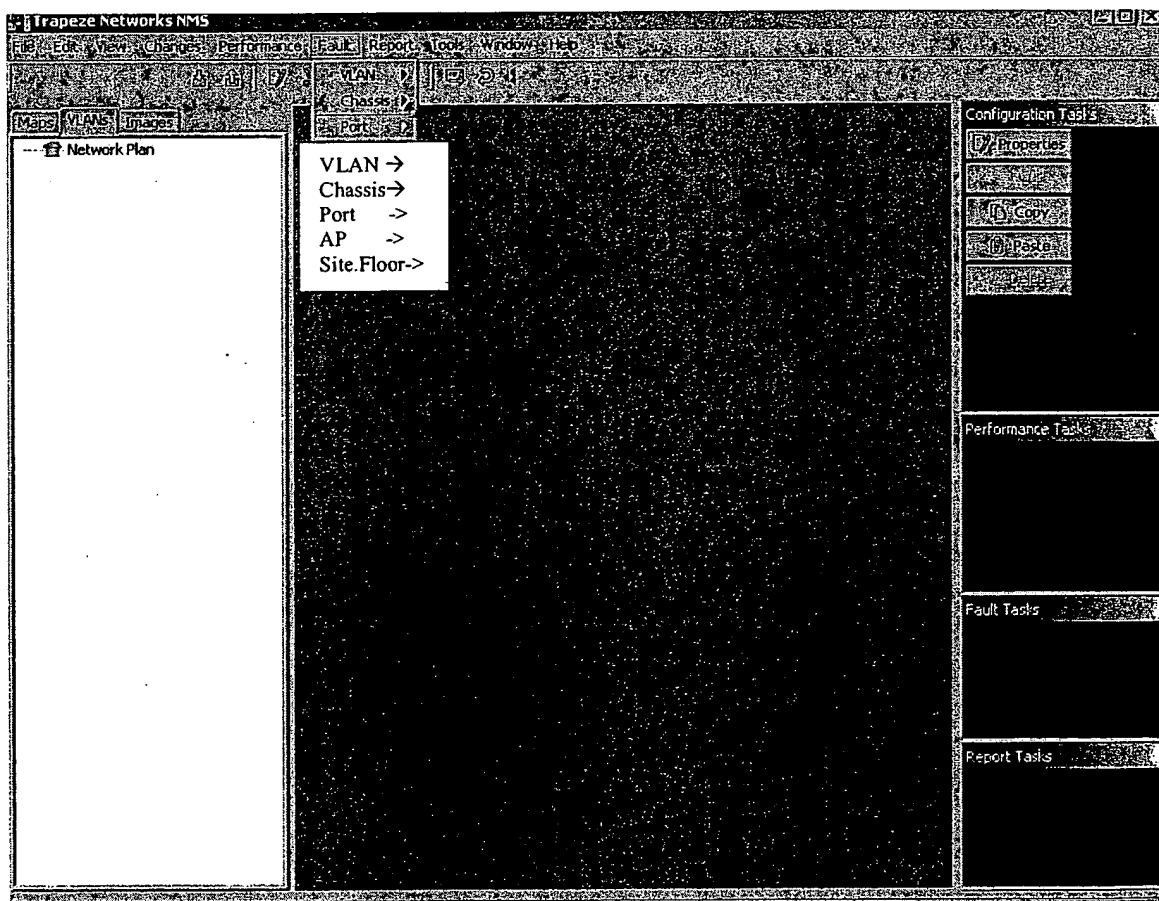
6.6.7 TUNNEL MANAGEMENT STATISTICS

- How many tunnels?
- % of tunnel traffic vs. non-tunnel
- Polls of allowed clients

6.7 FAULT MANAGEMENT

This section will describe the fault management capabilities and embedded features. The fault parameters will be easily accessible from the configuration and/or performance views of the network. JumpPad will retrieve all the event log information from the DP on demand (at least for release 1.0) or periodically and launch the Fault/Event Viewer. JumpPad will provide a flexible filtering tool to filter Events/Faults by DPs, by APs, by Clients, by event category, by severity, and by date/time. DP currently stores a complete set of all the events/faults (probably limited by buffer size or date/time) and JumpPad will use bulk-transfer protocol between JumpPad-DP to retrieve the event/fault data. Currently JumpPad does not have callback mechanisms to automatically receive Faults/Event from the DP. Instead JumpPad will periodically polls DPs to retrieve the Faults/Events. Since HP-Open View provides real time fault management such as alarm correlation and monitoring already, Trapeze JumpPad will not duplicate the same functionality as HP-OpenView.

In post-1.0 release, JumpPad may choose to retrieve historical Fault/Event data from syslog daemon (note that some of the DP-specific events/Faults are not going to be forwarded to Syslog daemon) and use that data to help diagnose or correlate certain error situation and problems over time.




- **Fault Menu**

The Fault menu allows the user to retrieve and view Fault/Event log of the selected object, such as VLAN, Chassis, or port. The user should be able to select any object such as a DP, or a port, and launch the Fault Viewer for that particular object.

- **VLAN Menu Item**
 - VLAN Menu Item provides the Fault/Event Viewer for the VLAN. ??? User needs to select a particular VLAN and launch the Fault menu.
- **Chassis Menu Item**
 - Chassis Menu Item provides the Fault/Event viewer for a selected Chassis.
- **Port Menu Item**
 - Port Menu Item provides the Fault/Event Viewer for a selected port.
- **AP Menu Item**
 - Port Menu Item provides the Fault/Event Viewer for a selected AP.
- **Site.Floor Menu Item**
 - Port Menu Item provides the Fault/Event Viewer for a selected floor, building, or site.

6.7.1 EVENT/FAULT FILTERING CAPABILITY

As stated in previous Menu overview section, all operations and actions are object-based and context-sensitive. If a user selects DP, and he can launch the Fault/Event Viewer from the Fault menu filtered out only by that particular DP. If a user wants to see the entire Faults/events in the network, he can select the entire network, and launch the Fault/Event Viewer. All the columns in the Event/Fault viewer can be sorted. The following is a brief screenshot of the Fault/Event Viewer launched:

| Date | Time | Severity | Name | Event ID | Description |
|---|----------|----------|------|----------|---|
|  | 01:23:54 | Critical | skye | 9999384 | %SPANTREE-5-PORTDEL_SUCCESS:3/2 deleted from VLAN 1 (PAgP_Group_Rx) |
| | | | | | |

JumpPad will provide a Filter Manager in the Event/Fault viewer, and the user can use the filter manager to create different filtering criteria such as:

- Last 1 hour
- Last 24 hour
- By Severity
- By VLAN
- By DP

- By AP
- By Client
- By Event Category (Event ID?)

6.7.2 CRITICAL FAULTS THAT JUMPPAD SUPPORTS

JumpPad shall provide some limited Fault correlation and help to monitor the general health of the devices. For example, JumpPad shall identify a list of critical Faults/Events, and upon receiving those, and use the color scheme to identify the critical alarm area of the network. JumpPad shall also identify a list of critical Faults/Events, and upon receiving them, and clear the colors of the critical area. (Not sure how much we can do in this area in R1.0 time frame).

6.7.3 VLAN LEVEL FAULTS

Selection: The user selects a VLAN from any organizer view. And click on Fault->VLAN->General Health.

Fault
VLAN -> General Health
Event Logs

6.7.3.1 FAULT-> VLAN-> GENERAL HEALTH

This option provides a context view showing the following information for the DP and all associated APs.

- Number of Alarms (per VLAN)
 - For this data, the user will have the option to investigate the actual alarms related to the particular DP or an AP.
- Number of Errors (per VLAN)
 - Same capability to investigate errors as per the alarms.

| | |
|------------------------|--|
| Pre-conditions | User selects a VLAN and launches the Fault->VLAN->General Health menu option |
| Post-conditions | A general health view dialog or frame will be launched for the VLAN |
| Main-Flow | <ol style="list-style-type: none"> 1. JumpPad application finds all the DPs and Ports in the VLAN, and retrieves the faults from all of them. 2. JumpPad application computes and summarizes number of alarms and number of Errors for all the devices in the VLANs. 3. JumpPad presents the queried results and presents them in the list view format in |

| | |
|------------------------|---|
| | the context view. |
| Exceptions | |
| Alternate Flows | User selects the Fault->VLAN->General Health menu and select the DP |
| Issues | |

6.7.3.2 FAULT->VLAN -> EVENT LOG

This option provides a context view showing the list of events for the DP and all associated APs. For event, the user will be able to sort by AP, as well as on severity and filter on severity.

| Date | Time | Severity | Name | Event ID | Description |
|------------|----------|----------|------|----------|---|
| [REDACTED] | 01:23:54 | Critical | DP | 9999384 | %SPANTREE-5-PORTDEL_SUCCESS:3/2 deleted from VLAN 1 (PagP_Group_Rx) |
| | | | | | |

6.7.3.3 FAULT->VLAN -> CLIENT AUTHENTICATION ISSUES

This option provides a context view showing the list of authentication failures per VLAN for the clients. Included in this will be authentication failures as well as RF association failures.

| Date | Time | Severity | Name | Event ID | Description |
|------------|----------|----------|---------------|----------|--------------------------------|
| [REDACTED] | 01:23:54 | Critical | DP.AP.client1 | 9999384 | Client Authentication failures |
| [REDACTED] | 01:23:54 | Critical | DP | 9999384 | RF Association Failures |

6.7.4 DP LEVEL FAULTS

Selection: The user selects DP from any organizer view. All of the fault option panels will be polled periodically for the data. The poll rate will be configurable per panel but a default will be configurable as part of the application preferences.

| |
|---|
| Fault Chassis -> General Health Event Logs Client Authentication Issues |
|---|

6.7.4.1 FAULT->CHASSIS ->GENERAL HEALTH

This option provides a context view showing the following information for the DP and all associated APs.

- Current State (Up/Down)
- Uptime (DP and APs)
- Number of Alarms (DP and APs)
 - For this data, the user will have the option to investigate the actual alarms related to the particular DP or an AP.
- Number of Errors (DP and APs)
 - Same capability to investigate errors as per the alarms.

| | |
|------------------------|---|
| Pre-conditions | User selects a DP and launch the Fault->Chassis->General Health menu option |
| Post-conditions | A general health view dialog or frame will be launch for the DP |
| Main-Flow | <ol style="list-style-type: none"> 1. JumpPad application retrieves the faults for the DP and all APs that the DP manages. 2. JumpPad application computes and summarizes number of alarms and number of Errors for the DP and all the APs the DP manages. 3. JumpPad presents result in the list view format in the context view. |
| Exceptions | |
| Alternate Flows | User selects the Fault->Chassis->General Heath menu and select the DP |
| Issues | |

6.7.4.2 *FAULT->CHASSIS ->EVENT LOG*

This option provides a context view showing the list of events for the DP and all associated APs. For event, the user will be able to sort by AP, as well as on severity and filter on severity.

6.7.4.3 *FAULT->CHASSIS -> CLIENT AUTHENTICATION ISSUES*

This option provides a context view showing the list of authentication failures per DP for the clients. Included in this will be authentication failures as well as RF association failures

6.7.5 AP LEVEL FAULTS

Selection: The user selects AP from any organizer view. All of the fault option panels will poll periodically for the data. The poll rate will be configurable per panel but a default will be configurable as part of the application preferences.

Fault

AP -> General Health

Event Logs

Client Authentication Issues

6.7.5.1 *FAULT->AP ->GENERAL HEALTH*

This option provides a context view showing the following information for the AP.

- Current State (Up/Down)
- Uptime (AP)
- Number of Alarms (AP and clients)
 - For this data, the user will have the option to investigate the actual alarms related to the particular client or an AP.
- Number of Errors (AP and Clients)

Same capability to investigate errors as per the alarms.

6.7.5.2 *FAULT->AP -> EVENT LOG*

This option provides a context view showing the list of events for the AP. For event, the user will be able to sort and perform filtering on the Event Log Viewer.

6.7.5.3 *FAULT->AP -> CLIENT AUTHENTICATION ISSUES*

This option provides a context view showing the list of authentication failures per AP for the clients. Included in this will be authentication failures as well as RF association failures.

6.7.6 PORT LEVEL FAULTS

| |
|--|
| Fault Port -> General Health Event Logs |
|--|

6.7.6.1 *FAULT->PORT -> GENERAL HEALTH*

This option provides a context view showing the following information for the selected Port.

- Current State (Up/Down)
- Uptime (Port)

- Number of Alarms (for the port)
 - For this data, the user will have the option to investigate the actual alarms related to the particular DP or an AP.
- Number of Errors (for the port)
 - Same capability to investigate errors as per the alarms.

| | |
|------------------------|--|
| Pre-conditions | DP device is connected and NMS is running |
| Post-conditions | A general health view dialog or frame will be launch for the Port |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects a Port and launches Fault->Port-General Health menu. 2. JumpPad application retrieves the state of the port (up/down), number of the alarms and errors related to the port from DP. 3. JumpPad presents result in the list view format in the context view. |
| Exceptions | |
| Alternate Flows | User selects the Fault->Port->General Heath menu and then select the Port |
| Issues | |

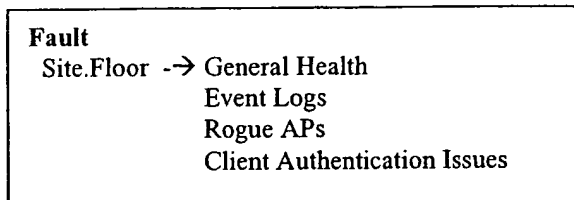
6.7.6.2 FAULT->PORT -> EVENT LOG

This option provides a context view showing all the events for the Port.

| Date | Time | Severity | Name | Event ID | Description |
|------------|----------|----------|---------|----------|-------------|
| ██████████ | 01:23:54 | Critical | Dp.port | 9999384 | xxx |
| | | | | | |

6.7.7 FLOOR, BUILDING, SITE LEVEL FAULTS

Selection: The user selects a floor or building or site from any organizer view and launches the Fault->Site.Floor menu item for a list of available faults/events.



6.7.7.1 FAULT->FLOOR.SITE -> GENERAL HEALTH

This option provides a context view showing the following information for all DP/APs in the container.

- Current State (Up/Down)
- Uptime
- Number of Alarms
 - For this data, the user will have the option to investigate the actual alarms related to the particular Floor, Site, or Building.
- Number of Errors

Same capability to investigate errors as per the alarms.

6.7.7.2 FAULT->SITE.FLOOR -> EVENT LOGS

This option provides a context view showing the list of events for all of the DPs and all associated APs. For event, the user will be able to sort by AP, as well as on severity and filter on severity.

6.7.7.3 FAULT->SITE.FLOOR -> ROGUE APS

This options provides a context view showing the list of rogue APs and allows the user to shown on the topology map where/who detected them.

6.7.7.4 FAULT->SITE.FLOOR -> CLIENT AUTHENTICATION ISSUES

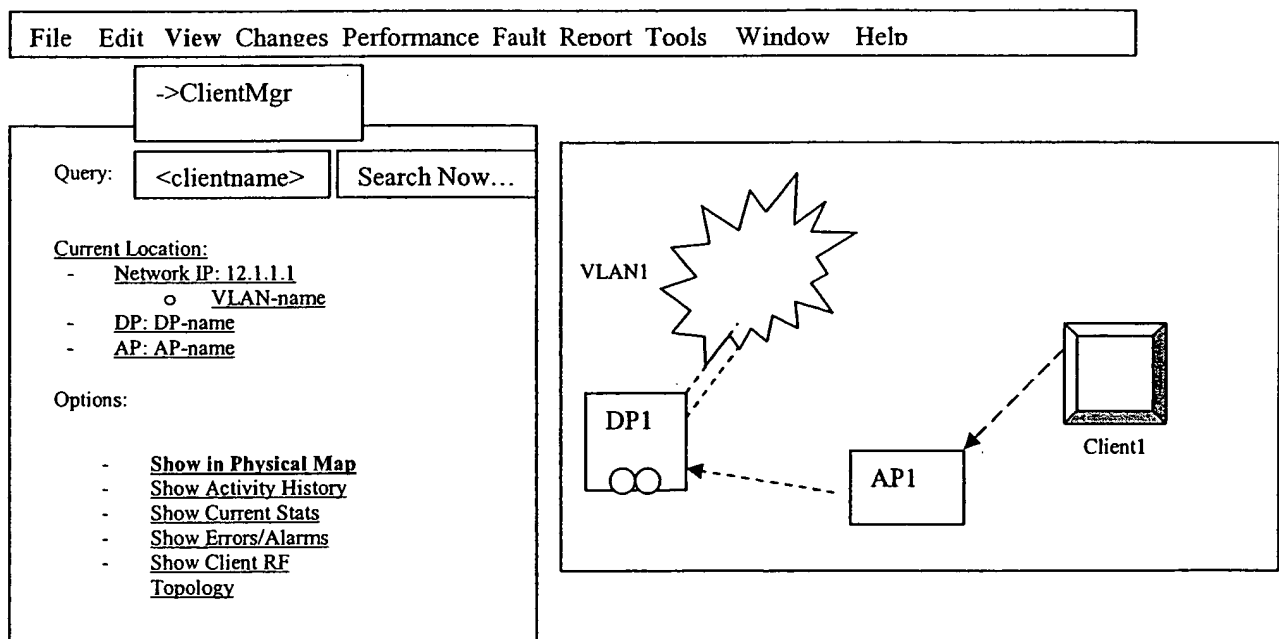
This option provides a context view showing the list of authentication failures per DP/AP for the clients. Included in this will be authentication failures as well as RF association failures.

6.8 CLIENT MANAGEMENT

Jumppad application will provide the network manager with a more client focused view of the world. It will allow the user to review performance/fault/configuration related to a user defined client. User can select "Client Mgr" under "View" menu to bring up the Client Manager view.

The Client Manager view will allow the user to search for a specific client on the network and relate that client to the network infrastructure they are currently using. The client view will also allow the user to perform the following functions:

- Show where the client is currently connected and topological location in the map
- Show where the clients have been and the client activity history
- Show Home DP and Roaming History
- Show the client properties such Signal strength, Channel speed, and authentication info
- Show Client stats information
- Show client fault information
- Show Client RF Topology (?)



6.8.1 LOCATING A CLIENT

The view will allow the user to enter a client name (i.e. user login name or PC name), upon invocation of the search function, the application will find a list of locations (could be more than one) the current DP/AP that the client is currently on. The view panel shows the current location and below the information provides a list of options the user may invoke to review the client

The client query will remember previous queries so that the user may easily find clients that they choose to find often.

[We could provide a way for the user to define a list of clients they always want to find (i.e. Add to track list) and the track list finds all of the clients all of the time.

| | |
|------------------------|--|
| Pre-conditions | User selects a View->Client Manager |
| Post-conditions | One or more clients matching the client name are located |
| Main-Flow | <ol style="list-style-type: none"> 1. User enters Client by IP Address (or host name, or MAC Address) 2. Jumppad will go to each devices in the networks, and query the location of the clients 3. Jumppad displays the list of the clients to the user (there could be more than 1 clients). Each location includes the following information: <ol style="list-style-type: none"> a. Network IP Address: b. DP: c. AP: |
| Exceptions | |
| Alternate Flows | |
| Issues | Do we need to support wildcard in search? |

The client information typically includes Network IP address, which AP the client is connected to, and which DP the client is connected to.

- All of the above information will have the ability to relate/link into a more general view of the DP and/or APs views previously defined.
 - For example, once we have found a client, we could allow the user to say “show where connected in RF map” and we would bring up the RF topology map with the particular AP highlighted.

6.8.2 GETTING CLIENT ACTIVITY HISTORY

Once the user has located the client, user can choose the option of : Show Client Activity History. This option will allow the user to locate:

- Home DP
- Roaming History
- Where the client have been (what are the locations that the client have been, and connected to)

| | |
|--|--|
| <p>Query: <input style="width: 100px;" type="text" value="<clientname>"/> <input type="button" value="Search Now..."/></p> <p><u>Current Location:</u></p> <ul style="list-style-type: none"> - <u>Network IP: 12.1.1.1</u> <ul style="list-style-type: none"> o <u>VLAN-name</u> - <u>DP: DP-name</u> - <u>AP: AP-name</u> <p>Options:</p> <ul style="list-style-type: none"> - <u>Show in Physical Map</u> - <u>Show Activity History</u> - <u>Show Current Stats</u> - <u>Show Errors/Alarms</u> - <u>Show Client RF Topology</u> | <p>Client Activity History:</p> <p>Home DP Location:</p> <p>Client past locations:</p> <div style="margin-left: 40px;"> <p>location 1:</p> <ul style="list-style-type: none"> -- date-time ---DP ---AP --- Roaming History <p>Location 2:</p> <ul style="list-style-type: none"> -- date-time -- DP -- AP -- Roaming History </div> |
|--|--|

| | |
|------------------------|---|
| Pre-conditions | A Client has been located. |
| Post-conditions | All the historical Client locations, home DP, and roaming history will be displayed. |
| Main-Flow | <ol style="list-style-type: none"> User selects a client, and clicks on "Show Activity History" Jumppad will go to each devices in the networks, and query DP whether they have any information about that client, and retrieve the information. Jumppad displays the list of the client locations to the user: <ol style="list-style-type: none"> Client Home DP Client past locations Client roaming history |
| Exceptions | |
| Alternate Flows | |
| Issues | Do we need to support wildcard in search? |

6.8.3 GETTING STATS BY CLIENT

Once the user has located the client, he can view current statistics for that client. Jumppad provides information about the wireless statistics and performance data for each client.

- Packets/bytes re-transmitted on current AP
- Signal to noise

| | |
|---|--|
| <p>Query: <input style="width: 100px;" type="text" value="<clientname>"/> <input type="button" value="Search Now..."/></p> <p><u>Current Location:</u></p> <ul style="list-style-type: none"> - <u>Network IP: 12.1.1.1</u> <ul style="list-style-type: none"> ○ <u>VLAN-name</u> - <u>DP: DP-name</u> - <u>AP: AP-name</u> <p><u>Options:</u></p> <ul style="list-style-type: none"> - <u>Show in Physical Map</u> - <u>Show Activity History</u> - <u>Show Current Stats</u> - <u>Show Errors/Alarms</u> - <u>Show Client RF Topology</u> | <p>Client Current Stats:</p> <p>Packets/bytes sent/received:</p> <p>Signal to noise:</p> <p>Packets error/retransmissions</p> |
|---|--|

| | |
|------------------------|---|
| Pre-conditions | A Client has been located. |
| Post-conditions | All current stastics and performance data for the client will be displayed. |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects a client, and clicks on "Show Current Statistics" 2. Jumppad will go to the devices that the Client is currently connecting on, and query stats from the device.. 3. Jumppad displays the list of the client locations to the user: <ol style="list-style-type: none"> g. Packets/bytes sent/received h. Signal to noise ratio i. Pacekts error/retransmissions |
| Exceptions | |
| Alternate Flows | |
| Issues | |

6.8.4 GETTING FAULTS BY CLIENT

User can also look at the Faults/Errors information for that client once the client is located. The following parameters will be collected:

- Errors/faults on the wireless and wired network for this client
- Number of failed attempts of authentication/logins

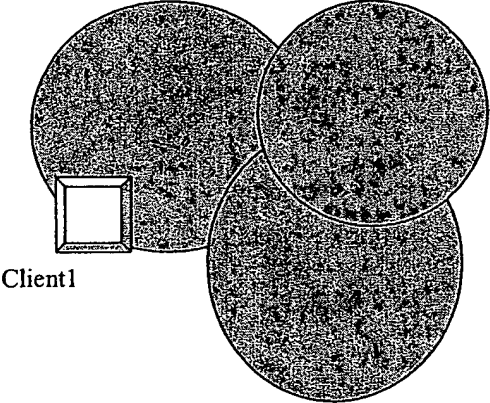
| | |
|--|--|
| <p>Query: <input style="width: 100px;" type="text" value="<clientname>"/> <input type="button" value="Search Now..."/></p> <p><u>Current Location:</u></p> <ul style="list-style-type: none"> - <u>Network IP: 12.1.1.1</u> <ul style="list-style-type: none"> ○ <u>VLAN-name</u> - <u>DP: DP-name</u> - <u>AP: AP-name</u> <p><u>Options:</u></p> <ul style="list-style-type: none"> - <u>Show in Physical Map</u> - <u>Show Activity History</u> - <u>Show Current Stats</u> - <u>Show Errors/Alarms</u> - <u>Show Client RF Toplogy</u> | <p>Client Current Faults:</p> <p>Packets/bytes erros:</p> <p>Failed Athentication attempts:</p> <p>Etc:</p> |
|--|--|

| | |
|------------------------|---|
| Pre-conditions | A Client has been located. |
| Post-conditions | All current faults data for the client will be displayed. |
| Main-Flow | <ol style="list-style-type: none"> 1. User selects a client, and clicks on "Show Current Statistics" 2. Jumppad will go to all the devices that the Client has been (past locations) and query faults/events from the device.. 3. Jumppad displays the list of the client locations to the user: <ol style="list-style-type: none"> j. Packets/bytes errors/retransmissions k. Failed Athentication attempts l. Login failed errors |
| Exceptions | |
| Alternate Flows | |

| | |
|--------|--|
| Issues | |
|--------|--|

6.8.5 SHOW CLIENT RF TOPOLOGY

User can also look at the RF topology with respect with where the client is located.

| | |
|---|---|
| <div>Query: <input type="text" value="<clientname>"/> <input type="button" value="Search Now..."/></div> <div><u>Current Location:</u><ul style="list-style-type: none">- <u>Network IP: 12.1.1.1</u><ul style="list-style-type: none">o <u>VLAN-name</u>- <u>DP: DP-name</u>- <u>AP: AP-name</u><div>Options:<ul style="list-style-type: none">- <u>Show in Physical Map</u>- <u>Show Activity History</u>- <u>Show Current Stats</u>- <u>Show Errors/Alarms</u>- <u>Show Client RF Topology</u></div></div> |  |
|---|---|

7 NOTES

[Delete this section once everything is covered]

7.1 ORGANIZER VIEWS

This section describes the various panels/views that appear in the left-hand side of the application window. Each organizer will provide a variety of functions as described in each sub-section.

7.1.1 NETWORK PLAN ORGANIZER

The Network Plan Organizer is the parent organizer of all other views and organizers. The network plan organizer provides the user with a tree layout of the currently opened network plan broken down into four levels (map, site, building, and floor). The map level is not shown as part of the hierarchy as this is the root of the tree and therefore is a single instance. It is the current application context. All other views...etc are based on the current network plan object.

Network Plan

- Menu Option: File -> New Network Plan... (Accelerator: Ctrl+N, Mnemonic: N)
- Menu Option: File -> Open Network Plan... (Accelerator: Ctrl+O, Mnemonic: O)
- Menu Option: File -> Close Network Plan... (Accelerator: Ctrl+L, Mnemonic: L)
- Menu Option: File -> Save Network Plan... (Accelerator: Ctrl+S, Mnemonic: S)
- Menu Option: File -> Save As Network Plan... (Accelerator: <none>, Mnemonic: <none>)
- Menu Option: Edit -> Delete (Accelerator: Ctrl+D, Mnemonic: d)

The network plan tree view (on the Organizer View) shows the entire active network plan user has selected to manage. It shows the hierarchy of the Site, Building, and Floor. Within each floor, the tree view shows how many DPs there are in the floor, and how many APs that the DP are talking to. One can view or modify the attributes of a DP when a DP is selected, and view all the attributes for a port when a port is selected. One can also configure all the DNS entries, IP protocol configurations, and all the APs that the DP is connecting to.

If the user clicks on the "DP1" node, the right side map view of the DP1 node will be high-lighted to show where the node is in the map view (as shown below). The same applies to the AP also.

The network plan map view shows where the DPs and APs are physically on the floor plan. One can choose to hide the background dxf map file if he chooses to. User should be able to select on the DP or AP object on the map as well to perform the same operation as in the tree view.

Note that the user can switch to the VLAN logical view any time.

7.2 CONTEXT VIEWS

7.2.1 DXF/PHYSICAL CONTEXT

- Shows a DXF Map and plots the positions of DPs and APs, links...etc

7.2.2 GEOGRAPHIC CONTEXT

- Shows a JPEG background of US? Or other?

7.2.3 LOGICAL CONTEXT

- Shows logical layout for L3, L2...etc

7.2.4 RF CONTEXT

- Shows RF topology map for a DP or map?

-

7.2.5 OBJECT CONTEXT EDITOR/VIEWER

- Allows the user to edit the currently selected object parameters in line as well as show the values when not editing
 - Edit a VLAN attributes or show read-only

7.3 TOPOLOGY SUPPORT

One of the main goals of the product is to provide good topology configuration for the DP/AP mix. This section should describe what and how we will show topology.

7.3.1 PHYSICAL TOPOLOGY

The following features are desired:

- For a single DP we will want to show what APs are connected to the DP.
- What ports the APs are connected to.
- The ability to enable/disable a particular port an AP is connected on.
- Easily reference statistical information for a particular AP or port on the DP.
- Shown preferably on top of a physical layout map of the building.
- Other views could define the "logical" physical topology.

7.3.2 RF TOPOLOGY

The following features are desired:

- Show the RF topology
 - How do we do Channel Assignments?
 - RF Coverage??
 - Interference?
- Hotspots
- Overlaps
- Dead spots
- Overlay the RF topology with the physical topology map.
- Allow the user to switch off the AP? Can we support this? I.e. don't disable the port in the DP but switch off the RF capability in the AP. Do we need to do this?
- Configure RF related capabilities for the set of APs
 - As a whole
 - Per Ap
 - Maybe have a set of default AP parameters that if you don't override for an AP it uses the default parameters. That way we can configure "as a whole" by setting the default parameters.

In the above RF Topology map, each color represents different channels and their coverage.

7.3.3 CLIENT TOPOLOGY

The following features are desired:

- Show what clients are currently connected to a particular AP.
- Overlay this topology with RF and physical topologies.
- Per client what information do we want to show:
 - IP address?

- Hostname?
- Wireless parameters?
- "Home" DP?

{TBD}

As part of the main application view there will be a variety of tasks available

- 1) Image management
 - a. Upgrading/Downgrading AP/DPs combinations
 - i. Compatibility checks
 - ii. Macros across multiples of them
- 2) Certificate Control
- 3) Client Management
 - a. Finding clients
 - b. Setup QoS per client/allow/deny
- 4) Topology viewers
 - a. "what if scenarios"
- 5) Performance/Fault Analysis
 - a. Hotspots
 - b. Health monitor
 - c. Faults
 - d. Security issues
 - e. Basic throughput viewing...etc
- 6) Configuration Parameters
 - a. All of the box config that is required.
 - b. Ability to import new config and download to box and make active
 - c. Ability to export new config to local hard disk